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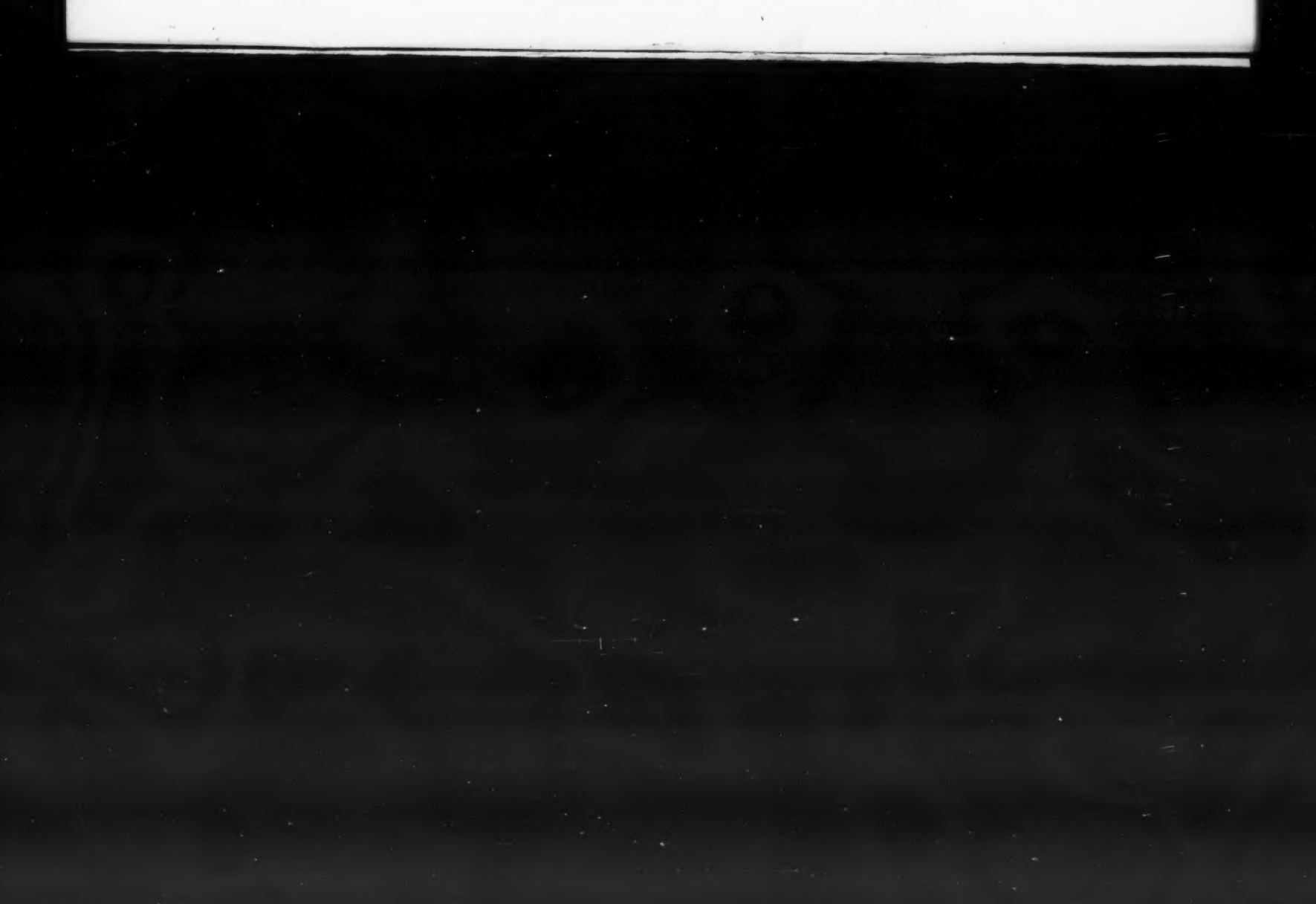

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THE PRODUCTION OF GOLD SINCE 1850.

THE statistics of gold production are unreliable. Much of the output is never reported to the officials.[1] There is a chance of error in converting "rough gold" or "unrefined bullion into fine gold.[2] Where exports are the only register of production, minted gold and gold ornaments are frequently included in the estimates of fresh production.[3]

For the purposes of this discussion the table of gold production compiled by Richard Rothwell for the *Mineral Industries* has been taken,[4] since they are on the whole least liable to error. These figures for production, reduced to percentages, are represented in the accompanying chart. The movement of production may be separated into two periods. From 1853 to 1883 the general tendency is downward. The production declines 38.4 per cent. Beginning with 1884, the line rises rapidly, standing in 1896 at 320.4 per cent. above the production of 1850.

To show the effect of the demand for gold upon its production, variations in its value may be compared with variations in the product. For the greater ease of comparison, the value of gold in terms of general commodities is represented in the same chart with the production figures. This expression of the value

[1] *Eleventh Census, Mineral Industries*, pp. 40–57.

[2] *Report of the German Monetary Commission.* Sessions 17 to 20, pp. 6, 7.

[3] The reported gold production of China has been discredited on this ground.

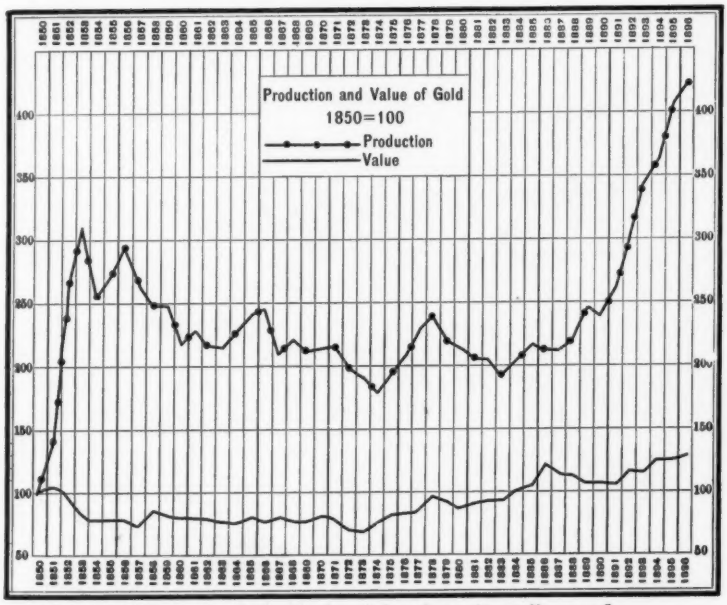
[4] ROTHWELL, *Mineral Industries of the United States*, 1895 and 1896.

of gold for the period in question is obtained by taking the reciprocals of Sauerbeck's index numbers,[1] and reducing them to percentages on the same basis as the figures of production. An examination of the line for the value of gold shows (1) that, with the exception of the years 1872 and 1873, it remained tolerably constant from 1853 to 1878, and (2) that from 1876 it rose rapidly standing at 124.2 per cent. in 1895. To express this movement in terms of demand, there was a stable demand for gold from 1853 to 1876, and an increasing demand from 1876 to 1895.

It appears that the production of gold, during the greater part of the period, does not correspond to the course of its value. From 1851–1855 the production decreased though the value remained approximately constant, and it increased from 1876 to 1884. Since 1884 the supply has shown an increasing correspondence with the value movement. Generally speaking, a constant or increasing value of any commodity is accompanied by an increasing production. The main purpose of this study is to explain the exception to this rule which appears in the production of gold.

Gold occurs in two general forms of deposit: veins and placers; more accurately, primary and secondary formations. Like other metals, it occurs throughout the earth. The manner of its deposit in veins is much the same as that of other metals. Fissures occur in the earth's crust. Water passes through the surrounding rocks and penetrates these fissures. The water takes into solution a part of the mineral contents of the rocks through which it passes, gold along with the rest. In the lower

[1] This formula for expressing the value of gold in terms of commodities was explained in this JOURNAL for March 1897, pp. 245–249. It should be noted that these index-numbers are, to a degree, untrustworthy, since they relate chiefly to raw materials, and therefore do not fairly show the increased value of gold as compared with manufactured products. These have been affected in supply by the progress of invention to a greater extent than the products of extractive industry. On the other hand, the London market, from which these prices are taken, is an exceptionally staple market, and the estimates are satisfactory in that respect, as also in that they are continued down to the present.



For table of figures on which this chart is based, see Appendix, p. 138.

levels the water becomes heated and dissolves larger quantities of metals. This impregnated water frequently returns toward the surface through fissures which offer an easy passage, and as it rises and cools, it deposits its mineral contents upon the sides of the fissures.

Gold preserves its identity in an exceptionally high degree, as it does not readily enter into chemical combination with other substances; owing to its high specific gravity, it occurs in much smaller quantities than most of the other metals; and it is extremely insoluble. These facts account for its scarcity, and for the relative difficulty of discovering gold in any considerable quantities. This difficulty is increased by the absence of color compounds, such as are so important a factor in the discovery of iron ore. The irregularities of the deposit, although in proportion to the gross amount they are no greater than in the case of iron, lead, or copper, are of far greater economic significance in the case of gold, because of its greater value.[1] Much the greater quantity of gold occurs below the water line. Above that point it has been freed from other substances by the action of water and oxygen. Below the water line, however, the presence of foreign substances greatly complicates the problem of extraction.[2] The difficulties to be met in gold mining under these circumstances are evidently considerable. The ore must be mined, often at great depths. It must then be sorted, crushed, stamped, and amalgamated with mercury. Special processes are necessary to treat gold ores which contain sulphur, or certain other substances. A large amount of capital and a high order of engineering skill are required in this work.

The extraction of gold from the secondary, or placer, formation is much more simple. The gold-bearing rocks have been disintegrated by the action of water, and the resulting detritus carried down into the beds of streams. Here the steady action

[1] A 10 per cent. fluctuation in the yield of a vein of lead at an average value of 3 cents per pound, is evidently of less consequence than a similar variation in the yield of gold, which brings $20.00 per ounce.

[2] EISSLER, *Metallurgy of Gold*, p. 4.

of running water separates the gold from the lighter minerals associated with it, by wearing them away and carrying them farther. The heavier metal lodges, frequently in large quantities, at the bars or riffles, wherever its progress is at all impeded. It is also scattered finely through the sands which form the beds of these streams. In this way the gold is almost entirely freed from foreign substances, and it usually lies at no great depth. Placer deposits are easily discovered and can be easily and rapidly worked. The miner's work consists merely in the further application of running water to the gold-bearing sand and gravel. The necessary implements are few and simple, and they are operated mainly by manual labor and require little skill in their use.[1]

Before 1850, vein mining, generally speaking, was not practiced. Practically all of the gold produced in the world since the discovery of America had been obtained from placers.[2] The pan and cradle were the tools in general use. Beginning with 1849 came a series of important placer discoveries in California and Australia. The working of these fields was pushed vigorously by thousands of miners with the primitive tools of the period, and the production rose to unprecedented figures. The year of greatest production in California was 1851, when gold to the amount of 81 million dollars was taken out. The same year witnessed the first attempt to work the quartz veins which are always associated with placers. From this time there was a steady decline in production; while the placers were being exhausted and the quartz mines opened. The production of California reached its lowest point in 1892, when it stood at 12.0 million dollars. In 1896 it had increased to 15.2 million dollars.

In 1851, the entire production was obtained from the alluvial deposits; in 1881 one-half was alluvial, and in 1892 10 per cent.

The average annual production of Australia, from 1852 to

[1] For the facts cited, see J. W. LOCK, *Practical Gold Mining*; T. EGGLESTON, *Metallurgy of Gold, Silver, and Mercury*; J. H. PHILLIPS *Ore Deposits*.

[2] LOCK, *Practical Gold Mining*, p. 156.

1860, exceeded two million ounces. The maximum of 3,150,121 ounces was reached in 1853. The rich alluvial deposits were rapidly exhausted and a decline began. By 1883, the production had fallen to $26,970,836. In 1895 it stood at $42,793,824. Vein mining in Australia began very slowly. The first attempt was made in 1857. In 1889, the ratio of alluvial to quartz production was as 37 to 63, in 1892 as 31 to 69.[1]

The gold production of Russia, until recent years, came entirely from placers. As the fields were exhausted the area of production has been sustained only by the constant exploitation of new fields.[2] The transition to vein mining has been in progress since 1882.[3]

In other gold producing localities the yield is obtained chiefly from vein mining.[4] The world must hereafter look mainly to the primary deposits for its gold supply.

The foregoing discussion explains the lack of correspondence between production and gold value for so long a part of the period under examination. Before 1850, the gold supply had been drawn from the placers with the simple tools and the small investment of capital which this form of extraction required. Beginning with 1849, came a series of rich discoveries followed by a rapid exhaustion of the placers. The quartz was then attacked. This form of production presented entirely new problems to the miner. The quartz must first be discovered, and this itself is difficult; new processes and new machinery must be invented. This abrupt transition to a new form of production was difficult, and some time elapsed before the exigencies of the

[1] The facts of the relative yield of quartz and placer mining in California and Australia are mainly taken from an article by MR. T. A. RICKARD, in the *Engineering Magazine*, vol. viii. p. 313. See also ROTHWELL, *Mineral Industries*, 1892, p. 192; LOCK, *Practical Gold Mining*, p. 57; *Eleventh Census, Vol. Mineral Industries*, p. 57; *Report of the Director of the Mint on Precious Metals in the United States*, 1894, pp. 193–197; *Engineering and Mining Journal*, vol. l. p. 310.

[2] ROTHWELL, *Manual Industries*, 1892, p. 203. *Ibid.*, 1894, pp. 590–591.

[3] *Ibid.*, 1892, p. 203, 1895, p. 659.

[4] The most important are, South Africa, Colorado, Dakota, and northern South America.

new situation were met. During the interval, in spite of the sustained demand for gold, its yearly production declined materially. After these difficulties were mastered, the increasing demand for gold called forth an increasing supply which has continued to the present.

The transition to quartz mining and the subsequent increase in production was the result of three forces: 1. A rising value of gold. 2. A progressive series of gold discoveries. 3. A considerable advance in the methods and machinery of gold extraction.

The considerable advance in the value of gold in recent years has been equivalent to a decreasing cost of gold production, since it has increased the purchasing power of the product over the instruments of its production. If we assume, as an extreme, that there has been a fall in gold prices of 42 per cent. from 1864 to 1895, the implication is that the gold miner who produced one-quarter ounce per day in 1895 has the same command over general commodities as a daily production of seven-twentieths ounce gave to the miner of 1864. As has been shown above, gold mining has required an increasing amount of capital to be invested in buildings and machinery. Large sums must also be paid for wages. The increasing value of gold has cheapened materials and machinery, and its tendency is also to lower money wages. If the supply and demand of labor remain constant this fall in money wages is inevitable.[1]

The average profits in gold mining have tended to rise; larger amounts of capital have been attracted into the business of gold extraction; and, as a result, new mines have been opened, and it has been possible to go on working mines of diminishing productiveness. We are safe in affirming that the recent increase in gold production has been to a large extent dependent on the fall in prices, and that even before the

[1] "It is a well-known fact that the average day wages paid in mining throughout the western states have largely declined, owing to the reduced cost of living. . . ."—*Eleventh Census: Mineral Industries*, p. 35.

increase began the same influence was operating in retarding the decline.

Closely connected with the increasing value of gold has been a progressive activity in prospecting. The element of discovery, as we have seen, is of prime importance in this branch of mining. A powerful stimulus is necessary to lead men to undertake so doubtful a business as the search for gold. The stimulus is supplied by a high value of gold, and it grows stronger as the value increases. It is true, discovery is largely a matter of chance; most of the finds have been the results of accident. It needs no argument, however, to prove that a thousand men searching for gold in a particular district have more chance of finding it than have five hundred gold seekers. In this way also the steady advance in the value of gold has operated to increase its production by increasing the prizes of success and of the number of prospectors. Before 1883, with the exception of some placer discoveries in Montana and Australia, few important discoveries had been made since 1862.[1] Prospecting activity was in the main unsuccessful. The declining production seemed to justify the predictions of an approaching gold famine, when the world's stock of coin must be drawn upon to supply the industrial demand.[2] But the value of gold continued to advance, and the search for gold became increasingly vigorous. This finally resulted in a remarkable series of discoveries. In 1883 production began at the Mount Morgan mine in Queensland.[3] In 1886 the Transvaal production began, in a district which had been unsuccessfully explored for twenty years preceding.[4] The mines of western Australia were opened in the following year,

[1] ROTHWELL, *Mineral Industries*, 1892, p. 127.

[2] This belief in an impending scarcity of gold is emphasized by SUESS in *The Future of Gold*, published in 1879. It also appeared in the discussions of the international monetary conferences of 1878 and 1881.

[3] See ROTHWELL, *Mineral Industries*, 1892, pp. 191, 192.

[4] Gold was first discovered in the Transvaal in 1867. The rush to the mines began in 1872, but by 1877 mining enterprise was at a standstill. An excitement in 1882 was followed by a collapse. In 1884, after prolonged efforts, rich discoveries were made in the De Kaap district, and in 1885, in the Witwatersrand.—ROTHWELL, *Mineral Industries*, 1892, p. 204.

after a series of failures.[1] A new era of production soon afterward began in the United States. The general business depression, and particularly the fall in the price of silver, stimulated the search for gold. Rich deposits were discovered in Colorado in ground which had already been thoroughly prospected for silver,[2] and the other gold producing states increased their yield. The laws against hydraulic mining were repealed in 1892.[3] Renewed prospecting activity was rewarded with rich finds in eastern Canada.[4] In 1894 came a series of gold discoveries in

[1] *Report of the Director of the Mint on Precious Metals in the United States*, 1894, p. 177.

[2] For an account of the Colorado discoveries see ROTHWELL, *Mineral Industries*, 1893, p. 325 (*Gold Resources of Colorado*, by T. A. RICKARD). See also *U. S. Geological Survey, Sixteenth Annual Report*, Part 2; *Geology and Mining Industries of the Cripple Creek, Colorado*, by WHITMAN CROSS and R. A. F. PENROSE, JR. ROTHWELL, *Mineral Industries*, 1893, p. 312, "Men thrown out of work by the closing down of the silver mines engaged in rewashing the gravel of old placers, in order to earn their living, while capitalists reopened old or low grade mines which had been neglected for many years in consequence of the greater possibilities in silver mining. Prospecting for gold was also stimulated and important discoveries were made."

TABLE SHOWING THE PRODUCTION OF GOLD IN FINE OUNCES BY STATES AND TERRITORIES IN THE UNITED STATES, 1890–1896, COMPILED FROM ROTHWELL, "MINERAL INDUSTRIES," 1895, 1896, AND FROM THE "REPORTS OF THE DIRECTOR OF THE MINT."

States and Territories	1890	1891	1892	1893	1894	1895	1896
Alaska.....	36,886	43,537	48,375	48,863	53,868	78,140	99,444
Arizona.....	48,375	47,166	51,761	57,286	86,324	95,072	124,770
California...	604,687	609,525	580,500	584,370	656,468	722.171	737,036
Colorado....	200,756	222,525	256,387	364,119	459,152	648,074	719,264
Idaho.....	89,494	81,270	83,271	79,669	100,682	86,088	104,263
Montana....	159,638	139,804	139,871	172,989	176,637	198,405	209,207
Nevada.....	135,450	99,169	76,021	46,367	55,042	75,088	116,620
Utah	32,895	31,444	31,936	41,293	41,991	66,419	91,908
South Dakota	154,800	171,731	178,987	193,809	159,594	187,187	237,978
New Mexico.	41,119	43,779	45,956	44,171	27,465	50,894	23,017
Oregon	53,213	79,335	67,725	79,592	68,792	39,918	59,513

[3] This kind of mining had been prohibited since 1882. By the law of 1892 operations could be resumed where the streams could be protected from the débris.

[4] *Report of the Director of the Mint on the Production of the Precious Metals in the United States*, 1894, pp. 217–219. See also *Report of the Geological Survey of Canada: Department of Mineral Statistics and Mines*, 1890, pp. 55 *et seq.*

British Columbia.[1] The Australian business depression increased the prospecting activity, and the discoveries in that country.[2] New gold fields have been opened in South and Central America,[3] and finally, in the last two years, rich finds are reported in Alaska, and active work is there in progress.

These discoveries have come in an accelerating series, answering to the increasing value of gold, and[4] they have been

[1] ROTHWELL, *Mineral Industries*, 1896, p. 248.

TABLE OF GOLD PRODUCTION IN BRITISH COLUMBIA.

Year	Production, fine ounces
1891	429,811
1892	399,526
1893	379,535
1894	530,530
1895	1,266,954
1896	1,788,206

[2] TABLE OF INCREASED GOLD PRODUCTION IN AUSTRALASIA.

Year	West Australia	New South Wales	Victoria	New Zealand	Queensland
1890	22,806 oz.	127,760	588,560	193,193	610,587
1891	30,311	153,336	576,399	251,996	576,439
1892	59,548	156,870	654,456	238,079	615,550
1893	110,891	179,288	671,126	226,811	616,970
1894	207,131	324,787	673,680	221,533	679,511
1895	188,683	315,144	695,681	264,142	511,313
1896	251,646	259,063	756,782	234,352	526,525

See also ROTHWELL, *Mineral Industries*, 1894, 1895, 1896; and *Report of the Secretary of Mines for Victoria*, 1893, quoted in *Report of the Director of the Mint*, 1894, p. 180: "Attention has been turned to old gold fields, where years ago rich quartz was mined, but which have been neglected, and in some cases almost forgotten. . . . . In addition to this a large amount of prospecting is being done in all parts of the colony resulting in new discoveries being made from time to time." "Much enterprise has been shown during the last few years in the search for gold, and many new mines have been opened up."—*Ibid.*, pp. 193–197.

[3] *Report of the Director of the Mint on the Production of the Precious Metals in the United States*, 1894, pp. 227, 238; ROTHWELL, *Mineral Industries*, 1895, p. 634; *Engineering and Mining Journal*, vol. lix. p. 339.

[4] It is to be noted that prospecting has now become an art, proceeding according to certain definite rules. A knowledge of the characteristics of a district is of great use in gold discoveries therein.

accompanied by a series of important improvements in methods and appliances. The improvements made may be discussed under two heads: placer mining, and vein mining. Though placer working is relatively easy, it presents many difficulties after the rich alluvium of the river bars has been exhausted. The gradual exhaustion of the bars has forced the miner to improve his methods in order to profitably extract the gold which lies finely scattered throughout the sands of the river beds. The gold is sometimes found under a thick mass of worthless surface materials. In the case of deposits in old river beds, this covering is frequently hundreds of feet in thickness. Rich placers are also sometimes exposed in the dry beds of streams out of convenient reach of water. Where the gold occurs in clay deposits it cannot be treated by the ordinary processes.

The principal appliances for placer working are the cradle and the "sluice."[1] The capacity of these appliances has been greatly enlarged.[2] Great improvements have been made in appliances for pumping out workings[3] and for bringing the gold-bearing earth to the head of the sluice, and powerful steam dredges are employed to strip the gold deposits where these

[1] The cradle is a box set on rockers, in which the gold bearing gravel is disintegrated by mixing with water and rocking. The sluice consists of an inclined channel through which flows a stream of water. Into this channel the gold bearing earth is thrown, the water carrying away the worthless material and cleaning the gold. *Cf.* LOCK, *Practical Gold Mining*, pp. 157, 169.

[2] For the "blanket" and apron of the cradle, and in place of the flat strips of wood or riffles placed on the bottom of the sluice box, has been substituted a riffle box. This is formed of shallow compartments filled with mercury. It takes up a much larger proportion of the gold. This has in its turn been supplanted by copper plates covered with nitrate of mercury to which the gold adheres. Multiple sluices enable washing to proceed without interruption, one section being cleaned up while the other is working. The under-current sluice is inserted under the last box of the main sluice which is provided with an iron grating. The large and coarse material passes out while the fine matter containing most of the gold enters the lower sluice, which, with a slower current, catches much of the gold that would otherwise be lost. *Ibid.* pp. 159, 169, 180, 181.

[3] Water in alluvial workings was primarily pumped out by hand. The present method is by chain pumps worked by water or steam power, or by large siphons. As the workings went deeper; the "pay dirt" was thrown by hand up a series of stages.

occur at a moderate depth.[1] For working the dry placers, which occur extensively in South America, Australia and Siberia, various machines have been invented to meet the deficiency of water.[2] Puddling machines have been invented for working gold found in connection with clay. These are in large use in Australia, where water is not available for hydraulic mining.[3] For extracting the gold scattered throughout the river beds the principal methods introduced in late years, are "river lifting" and dredging.[4] Wing dams have also been employed.[5]

The most important advance in the extraction of gold from the secondary formation has been the discovery and improvement of the methods of hydraulic mining. This merits some more detailed description, both on account of its past importance, and because it will probably take the place of many of the simpler methods now in vogue for placer working. The "drifts" of the western slopes of the Sierra Nevada range have already been mentioned.[6]

The gold occurs very irregularly in these drifts. If this gold was to be extracted, some method of rapidly handling large

This has been superseded by various devices worked by horse or water power, by which the earth is rapidly conveyed to the surface in buckets. The latest improvement in this appliance is a cable tramway worked by steam power. *Ibid.*, pp. 186, 188, 190.

[1] *Ibid.*, p. 190; and *Engineering and Mining Journal*, Nov. 20, 1897.

[2] One of these substitutes a pulsating blast of air for a stream of water. Another device throws the gold bearing dirt by centrifugal action against a wall of mercury. *Ibid.*, pp. 197–198.

[3] *Ibid.*, pp. 182 *et seq.*

[4] In "river lifting" the stream is allowed to flow over a flume beneath which the exposed bed is washed for gold. Streams have thus been "lifted" for a distance of one-half to three-fourths miles.

The steam dredge is in large use in New Zealand, where large quantities of gold have been obtained by this means. In its most common form it consists of a series of scoops running on an endless chain, and carrying the sand to the head of the sluices. A suction pump dredge has also been used. *Ibid.*, p. 201, *Transactions A. I. M. E.*, vol. xxi. p. 453.

[5] Parallel dams are built. The water above the first dam is allowed to flow through a flume below the second, while the space between the dams is pumped dry. LOCK, *ibid.*, p. 201.

[6] Page 10 above.

quantities of material must be devised, This method was found in the hydraulic process. In this process, water is thrown against the gravel banks in large volume and under high pressure, supplied from reservoirs high above the point where the washing is done. The banks are first shaken by powder blasts, and when the water is turned against them, the gravel is torn down in large quantities and washed through a long line of sluices, and much of the gold is caught on the riffles of the sluice boxes. The machinery consists (1) of pipes of sufficient size and strength to convey water under high pressure against the bank which is being attacked, and (2) of a system of reservoirs, ditches, and flumes to hold and convey the water.[1] In the early development of hydraulic mining much loss was sustained in the destruction of flumes and ditches by floods, and from an intermittent flow of water. These difficulties have been met by improved construction.[2]

An important modification of the original process is the hydraulic elevator. This is used to exploit the flat beds of alluvium which it is not possible to treat by the ordinary methods. It consists essentially of an inclined pipe up which the gold bearing gravel is forced by the action of a powerful stream of water. At the top of the pipe the gravel is deflected into a series of sluice boxes.[3]

The cost of hydraulic mining under favorable conditions is very low. In some gravel beds it is less than three cents per cubic yard.[4]

[1] *Transactions A. I. M. E.*, vol. vi. p. 27, and vol. xxii. p. 325. See also *Engineering and Mining Journal*, vol. xliv. pp. 563–565.

[2] For example, where the flume passes through a cañon, or along the side of a cliff, the earlier usage was to support it by trestles from below. Instead of this the flumes are now suspended from iron brackets inserted in the rocks. The intermittent flow of water, which formerly forced many mines to suspend operations during the dry season, has been remedied in many places by storage reservoirs that keep up a steady supply of water the year around. The price of water has also fallen from 25 cents per miner's inch to 8 cents in some localities.— See *Engineering and Mining Journal*, vol. xlix., pp. 563–565, LOCK, *Practical Gold Mining*, p. 359.

[3] *Transactions A. I. M. E.*, vol. xxii. p. 325. Under some conditions this appliance raises 1½ tons of gravel per minute.

[4] *Transactions A. I. M. E.*, vol. xxii. p. 325.

IMPROVEMENTS IN VEIN MINING.

The general improvements in this branch of gold mining are similar to those which have revolutionized every department of mining industry. Their application to silver mining has been described in some detail in an earlier article.[1] It will therefore be necessary only to summarize them at this time. They comprise the rapid extension of transportation facilities into mining districts; the use of electricity in lighting, and in operating machinery; improved appliances for hoisting, which have also tended to offset the disadvantages of deep mining; improved construction of ore mills, where the force of gravity is utilized to move the ore; improved samplers and concentrators which have almost entirely displaced hand labor in these operations; roasting furnaces which make that process automatic, and finally great advances in the construction of ore crushers and stamps. The special improvements in machinery and processes require some attention. One of the most important improvements in machinery is the prospecting drill, which enables a sample to be taken of every foot of rock through which it passes. By its use the continuity of the Rand reefs to a depth of 2400 feet has been demonstrated.[2] The machinery used in amalgamation has also been greatly improved. Much of the gold, when separated from its matrix, is so fine as to float away on the surface of the water. The prevention of the resulting waste has presented a serious problem. The most successful methods hitherto employed consist of a series of tables covered with burlap, or coarse sacking, over which the waste material is allowed to flow, the fine gold being caught in the cloth.[3]

The most important special improvements in gold milling have been made in the methods of treating the refractory ores that occur below the perpetual water line. In these, the gold is carried in sulphur or other compounds; and here the application of the ordinary amalgamation process has proved unre-

[1] "The Fall in the Price of Silver since 1873," in this JOUNRAL for June 1897.

[2] REUNERT, *Diamonds and Gold in South Africa*, Appendix 20.

[3] LOCK, *Practical Gold Mining*, pp. 229 *et seq.*

munerative.[1] The methods which have proven most successful in dealing with these ores are smelting, chlorination, and the cyanide process. Their importance for this discussion arises from the fact that the recent increase in gold production has come almost entirely from the refractory ores.

In the chlorination process, the ores, if they contain sulphur, are roasted after they come from the stamps. Chlorine gas is then passed through the mass, forming gold chloride, which is soluble in water. The gold is finally precipitated by the addition of sulphate of iron.[2] The tanks in which the chlorination takes place were at first stationary; and the gas was generated outside and admitted from below. This process proved a slow one, and revolving barrels were substituted which greatly accelerated the process. In some cases the ingredients from which the chlorine is generated are placed in the barrel along with the material which is to be treated; and the generation of the gas accelerated by agitation.[3] This improvement dates from the early eighties. The size of the barrel has been enlarged, thus increasing its capacity; and the difficulties of treating the pulp as it comes from the barrel have been reduced by the introduction of a filter.[4] Chlorine gas is now manufactured at central points and shipped in a condensed form to localities where the transportation charges on the raw materials would form a large part of the cost of treatment.[5] During the last few years, the cost of chlorination has been reduced from eight to twelve dollars per ton of the material treated,[6] to three to six dollars per ton.

The cyanide process was first applied on a large scale in 1891.[7] It was first employed to treat the gold bearing material which had been already subjected to the amalgamation process. These "tailings" are first treated with a one-half per cent. solution of potassium, cyanide; then with a 3 per cent. solution; and the gold is finally precipitated by the introduction

[1] EISSLER, *Metallurgy of Gold*, p. 4.
[2] *Transactions, A. I. M. E.*, vol. xxiii. pp. 338-339.
[3] *Ibid.*
[4] *Ibid.*
[5] *Engineering Magazine*, vol. xi. p. 669.
[6] *Ibid.*, p. 668.
[7] *Ibid*, p. 461.

of zinc shavings.[1] By this process 75 per cent. of the gold contained in the tailings is extracted, all of which would otherwise be lost if the producer must depend upon simple mercury amalgamation. Electrical precipitation has been introduced where the solution contains copper.[2] The cyanide process has recently been employed to treat the ore direct from the stamps.[3] By this method the labor of handling is greatly reduced, and a larger percentage of gold is saved. One-third of the gold produced in South Africa is now recovered by means of the cyanide process.[4] From October 1891, to October 1894, 1,225,115 ounces were produced by this process in the Rand district.[5]

This long series of inventions, co-operating with the increasing value of gold, have doubtless had the effect of greatly decreasing its absolute cost of production. That is to say, on ores of a richness similar to those which were profitably worked thirty years ago, the percentage of profit from present working has been much increased.[6] With the conditions of 1850 prevailing in 1897, the world's gold production would be a mere fraction of its present amount. The pick and pan of the early day would be helpless in the face of existing conditions. But the progress of

[1] See ROTHWELL, *Mineral Industries*, 1892, p. 239.

[2] In this case the zinc precipitation is imperfect. The electric current is passed through the solution, and precipitates gold on the negative pole and the metalloid at the positive — ROTHWELL, *Mineral Industries*, 1895, p. 339.

[3] Two and one-half tons of stamped ore and one-half ton of cyanide are put into a barrel in which freshly dressed amalgamating plates are set upright. The barrel is made to revolve slowly for an hour. The solution in then poured off and the plates are scraped. The pulp passes on into vats, where it is again treated with cyanide.— *Colliery Engineer and Metal Miner*, May 1897.

[4] *Ibid.*, August 1897.

[5] *Report of the Director of the Mint on Precious Metals in the United States*, 1894, p. 152.

[6] The *Report of the Director of the Mint on Precious Metals in the United States*, 1894, p. 147, gives average cost of production on the Rand at $6.50 per ton. See also p. 113. Formerly all the sulphides were wasted. The milling of gold has so progressed that it is now possible to work ores which ten years ago, were worthless.

"The cost of gold milling now runs from 30 cents to $1.60 per ton. These figures are taken from a large number of representative gold mills."— *Colliery Engineer and Metal Miner*, December 1896.

"With the large, low grade ore bodies which are destined to furnish the greater

improvement has steadily depressed the margin of production. Poorer and poorer ores have been successfully treated, so that if we regard the cost of production of gold as an average of the mining expenses of all producers, it is impossible to say that it has declined. On the contrary, it is very doubtful if their advances in methods and machinery, and this general cheapening of the instruments of production have offset the diminishing yield of the sources of supply. The marginal cost of production of gold has undoubtedly risen with its value; for the marginal cost of production of gold over long periods tends to conform to its value.

It appears, therefore, (1) that the lack of correspondence

part of the precious metals in the future, the costs at well located mines and mills may be roughly estimated at $2 per ton for mining, and $3 per ton for barrel chlorination, or for treatment by the cyanide process on ores from which 90 per cent. of the metal can be saved."—ROTHWELL, *Mineral Industries*, 1892, p. 224.

"Prior to 1875, mining was limited to ores running not less than $10 to $20 per ton for free mining ore; and on refractory ores from $35 to $50 per ton."—*Engineering Magazine*, vol. ii. pp. 462–463.

MINING COSTS.

ENGINEERING AND MINING JOURNAL, VOL. LIV, P. 132.

Name of mine	Year	Cost per ton
Plymouth Consolidated	1884	$3.89
Homestake	1885	3.03
Caledonia	1886	2.95
Caledonia	1887	3.20
Caledonia	1888	3.12
Caledonia	1889	2.74
Sierra Buttes	1889	3.68
Plumas Eureka	1889	3.98

ROTHWELL, *Mineral Industries*, 1895, p. 319.—Milling cost in four representative American districts.

District	Labor	Shoes and Dies	Water	Fuel	Supplies, etc.	Total
Black Hills	$.15	$.02	$.20	$.19	$.14	$.70
Gilpen	.42	.05½	..	.10	.17½	.75
Grass Valley	.32	.09	.31		..	.80
Amador	.20	.04½	.17		.04½	.46

between gold production and gold value from 1853 to 1884 was due to the difficulty of transferring the industry from the secondary to the primary forms of deposit; (2) that the decline in production was arrested and finally converted into an advance by the co-operation of three forces, (*a*) an increasing value of gold, (*b*) a progressive advance in prospecting activity, and (*c*) a series of improvements in the methods and machinery of extraction.[1]

THE FUTURE OF GOLD.

The transition from placer to vein mining has now been accomplished and the methods of vein mining have been perfected. Hereafter, no decrease of production need be feared between the exhaustion of the placers, and mining of the quartz, nor between the working of the free milling ores and the treatment of the refractory sulphides. When gold is discovered in the future, we may reasonably expect that quartz mining will be at once begun, and that low grade as well as high grade ores will be speedily attacked. This fact argues for greater continuity in the production of gold than has hitherto been the case.[2]

Gold mining in the past has suffered severely from stock speculation. There has been much gambling in the industry, and the resulting waste of capital has been enormous. A large amount of capital has been sunk in some fraudulent mining scheme; the public has been heavily mulcted and the available mining capital absorbed by the "operators." As a result, gold mining investment has come to a standstill. Proprietors of rich properties could not at any premium obtain the capital necessary to develop them. This has acted to diminish production. As the public comes to understand the nature of gold mining, and as the miners resort more and more to the large and uniform bodies of low grade ore, the prizes grow smaller and the attract-

[1] Acknowledgment is due to Mr. H. W. Nichols, curator of the Field Columbia Museum, for valuable assistance in the preparation of this paper.

[2] ROTHWELL, *Mineral Industries*, 1896, p. 248, gives the quartz production of British Columbia in ounces, as follow: 1893, 23,404; 1894, 125,014: 1895, 785,271; 1896, 1,244,180.

iveness of the lottery diminishes. We may therefore expect a decrease of speculation, and a more rational development of gold mining, and this will no doubt act to give the future production greater stability. It is not unreasonable to assume that a continued advance will be made in the machinery and processes of gold extraction. There is still room for great improvement, and the difficulties ahead will doubtless be overcome as those of the past have been. These general considerations afford ground for an optimistic view of the future of gold production.

Let us examine the question more closely from the standpoints of the effect of an increasing demand and the chance of new discoveries. We have seen that the production of gold has been profoundly influenced by its increasing value; and that, in particular, the increased production of the last fifteen years has been to a large extent the result of the great fall in general prices which has characterized this period. The natural inference is that a rise in general prices, which might be conceived to follow the general acceptance of a bimetallic policy by the great commercial nations, would speedily operate to diminish the output. So far as the maintenance of the present annual production depends upon the continuance of the present prospecting activity, such a result might be expected to follow from an advance in prices. A lower value of gold would no doubt lend to lessen the attractiveness of the search for gold. But so far as concerns existing companies and their efforts both in prospecting and in improving methods and machinery, it seems not unreasonable to suppose that a falling value of gold would operate not to weaken, but to intensify these efforts. Gold mining is an industry in which the element of fixed capital is of prime importance. Enormous amounts of capital has taken the form of gold mines and mills. Owing to the general descent to low grade ores,[1] the margin of profit on these investments is not large. The effect of rising prices, or in other words a falling value of gold, would be in many cases sufficient to wipe out this profit or even convert it into a loss. In every

[1] *Engineering and Mining Journal*, vol. lxiv. p. 422.

case the returns on the investment would be lessened. The gold miner would therefore be stimulated to offset this influence by introducing improved processes and machinery, to diminish his expenses by every form of economy, and to develop new sources of supply in the neighborhood of his plant. It is reasonable to assume that the prospect of certain loss would prove a stronger incentive to improvement than the chances of a small additional increment of profit would be, and that falling values therefore tend in some measure to counteract the decrease of production which is generally supposed to follow immediately from a decline in values. This has certainly been true in the case of silver. The well-known increase in inventive activity which follows every panic also gives confirmation to this view. To the extent to which this force might act — and there is reason to believe that its influence would be considerable — a falling value of gold would not decrease its production.

The bearing of this consideration upon the bimetallic claim for a possible concurrent circulation of gold and silver is significant. If a declining value of gold should fail to diminish its supply, there would be so much the less chance that the existing stock and future supply would be absorbed by the industrial demand. By so much, then, the chances of a concurrent circulation the two metals would be improved. On the other hand, if prices continue to fall, the same stimulus to invention and discovery that has so strongly influenced gold production the past thirty years will continue to operate. If the world will pay the price, it can, no doubt, obtain gold in increasing amounts.[1]

It remains to indicate the possibilities of the opening of new deposits. Of the gold producing countries, it is to be said, the United States and much of Australia have been thoroughly prospected, and wherever gold is found in these regions, mining activity immediately begins. We are chiefly concerned with those districts in which gold is known to exist, but which have not yet been exploited to any considerable extent. It is to these regions that we must look for the future supplies of gold.

AFRICA.

The most promising gold fields are found in South Africa, principally in the Transvaal. The gold in this region occurs in zones rather than veins, and there are no placers.[1] The occurence of gold is in conglomerate beds — masses of rounded quartz pebbles set in cement. The original formation was undoubtedly placers, but these were subsequently overlaid with other formations and solidified by heat and pressure. After these beds had been laid down horizontally, they were disturbed by volcanic action, and tilted in every direction; but the original strata have been preserved throughout. All the evidence points to the continuity of these beds throughout the district. The regularity of the deposit indicates that the gold-bearing strata run very deep.[2] The regularity of the South Africa reefs is of great importance for their yield, since it offers the prospect of a steady return to mining investment. The Rand reefs have been exposed for a distance of thirty miles and are at least one mile wide. The main series of reefs have been traced for a distance of 150 miles, and have been pierced by drills at a deposit of 2400 feet.[3] Bergrath Schmeisser[4] contends that on the estimate of a working depth of 800 meters, the supplies of gold on the Rand would amount to $1,020,828,355. If the depth is assumed to be 1200 meters, the supply would be $1,710,506.00. Hamilton Smith corroborates this estimate.[5] He holds that the Rand reefs are continuous and that they will produce £325,000,000. These estimates are countenanced by the regularity of the

[1] *Transactions A. I. M. E.*, vol. xviii. p. 335.

[2] ROTHWELL, *Mineral Industries*, 1892, pp. 204 *et seq.*

[3] REUNERT, *Diamonds and Gold in South Africa*, pp. 97, 98, 103. See also ROTHWELL, *Mineral Industries*, 1893, p. 315. *Engineering and Mining Journal*, vol. lxiii. p. 659.

[4] *Ueber Vorkommen und Gewinnung der nutzbaren Mineralien in der Südafrikanischen Republik.* A portion of this is reprinted in the *Report of the Director of the Mint on Precious Metals in the United States*, 1894, p. 118.

[5] Hamilton Smith is an American mining engineer who made a report in 1893 on the Rand district, to the London House of Rothschild. His report was revised in 1894, and reprinted in *Report of the Director of the Mint. Ibid.*, 1894, p. 163.

deposits. They assign the reefs an extreme length of between ten and twelve miles.

Similar gold deposits occur in other parts of the Transvaal.[1] In the DeKaap district the quartz is especially rich, and beds of conglomerate also occur in the eastern, northwestern, and western portions of the country. Similar beds are found in Cape Colony, in Zululand, in Matabele and Mashona land, and in the Orange Free State.[2] On the west coast, besides extensive alluvial deposits, there are large beds of the same conglomerate formation that occurs in South Africa.[3] Madagascar is also reported to contain gold in large quantities, but this country has not been thoroughly prospected.[4]

AUSTRALASIA.

The gold fields of western Australia have been already referred to. Unworked deposits of great richness occur in New South Wales.[5] In New Zealand are important deposits which have not been touched. The province of Otago is especially rich in gold.[6]

ASIA.

Valuable gold deposits are known to exist in southeastern Asia, both on the continent and the islands.[7] Considerable

[1] REUNERT, *Diamonds and Gold in South Africa*, p. 118.

[2] *Transactions, A. I. M. E.*, vol. xviii. p. 335. See also, REUNERT, *ibid.*, p. 118, Appendixes XII, XIII, XIV, XV, XVI, XVII, and XVIII.

[3] *Engineering and Mining Journal*, vol. li. pp. 323, 324. See also, *Annual Report on the Gold Coast*, reprinted in *Report of the Director of the Mint, ibid.*, 1894, p. 169.

"I doubt very much whether California ever presented to the naked eye the tempting wealth of gold which so forcibly attracts the attention of the traveler in the western districts of the Gold Coast."—*Ibid.*, p. 170; an extract from a paper by Mr. Hesketh Bell, F. R. G. S., Assistant Treasurer of the Gold Coast.

[4] *Engineering and Mining Journal*, vol. lxii. p. 122.

[5] *Report of the Director of the Mint, ibid.*, 1894, p. 194.

[6] "The extent of the gold-bearing alluvium lying among the highlands of this province is imperfectly known, but so far as it has been explored all facts point to the conclusion that it is enormous."— *Transactions, A. I. M. E.*, vol. xxi. p. 428.

[7] *Engineering and Mining Journal*, vols. liii. p. 409; lviii. p. 409; lxii. p. 337; liv. p. 196.

deposits are located in the Japanese archipelago.[1] The production of southern India has increased during recent years, and important discoveries have been made in that region.[2] Russian exploration in Thibet shows the existence of extensive gold fields, which, so far as is known, comprise about ninety square miles.[3] Gold is also found in Manchuria,[4] and large amounts of quartz are located in eastern Siberia, which have not been worked to any extent.[5] Gold occurs in large quantities in northern Asia Minor.[6]

EUROPE.

The Ural mountains contain large amounts of quartz. The ore of these deposits generally consists of low grade sulphides.[7]

SOUTH AMERICA.

Uruguay contains considerable quantities of gold deposit, particularly on the Brazilian frontier[8] and in spite of the long

[1] *Report of the Director of the Mint, ibid.*, 1894, pp. 243, 244.

[2] ROTHWELL, *Mineral Industries*, 1892, p. 197. See also, *London Economist*, Jan. 11, 1896.

[3] *Engineering and Mining Journal*, vol. liii. p. 661; vol. xlix. p. 113; and vol. xxiii. p. 41.

[4] *Engineering and Mining Journal*, vol. lxiv. p. 455.

[5] "So far as the Siberian gold fields, which furnish the greater part of the production, are concerned, it may be said that the work already done is entirely superficial. Only the placers have been worked, and these generally in a rather primitive way, while explorations have been, on the whole, limited to the haphazard work of prospectors. Deep mining is almost unknown."—*Engineering and Mining Journal*, vol. lxii. p. 434.

"The deposits of the Nerchinsk district, Amour region, and Yakutsk province, are distinguished for their richness, continuity, and considerable extension. In general the richness of the gold deposits of the rivers, Amur, Lena, and their tributaries, shows itself in every respect, beginning with the width, size of stratification, and the amount of gold they contain. . . . They are from four to six feet thick and are very uniform in their formation without any faults."—*The Industries of Russia*, published for the World's Columbian Exposition, vol. iv. pp. 12–13. See also, ROTHWELL, *Mineral Industries* 1895, p. 659.

[6] *Engineering and Mining Journal*, vol. xxiv. p. 423.

[7] *Engineering and Mining Journal*, vol. xliv. p. 363. See also, *The Industries of Russia*, vol. iv. pp. 12, 13, 15; and DAVIES, *Metalliferous Metals and Mining*, p. 35.

[8] *Engineering and Mining Journal*, vol. l. pp. 244–245. See also *Handelsarchiv*, December 1891.

continued production of Brazil, that country is still rich in gold.[1]

Deposits of very large extent are situated in Bolivia, which have not been worked to any considerable extent. Bolivia has two main gold belts; one beginning in the northwest and extending southeast, the other begins in the southwest, extends east, then northeast, and finally joins the northern belt. Large deposits also occur in the main range of the Andes, in the extreme north.[2] In the eastern part of Peru gold occurs in large quantities; both quartz and placer deposits being found.[3] In Ecuador, there are extensive quartz deposits and also large amounts of gravels so situated that they may be economically operated by the hydraulic process, with abundance of water, high dumps and swift streams to carry away the débris.[4] Columbia has produced, since the Spanish conquest, $700,000,000 of gold; almost entirely without machinery. The departments of Antioquia, Cauca, and Tolima are very rich both in placer and quartz deposits.[5] The

[1] Deposits of large extent are found throughout a great part of Minas Geraes, and in the states of Goyaz, Western Bahia, Maranhao, Matto Grosso, and So Paulo. In 1892 there were only four deep mines in operation in this region. In the vicinity of Minas Geraes the pyritic ores are very rich.—*Engineering and Mining Journal*, vol. liii. p. 277. See also *ibid.*, vol. l. p. 239. A large part of these deposits are composed of laterite. "This is the product of physical and chemical changes in the rocks due to atmospheric agencies under a tropical climate. Veins of quartz pass into this without change of direction or thickness; but the whole mass is so soft that it can be easily crushed between the fingers. Much of this contains gold and the deposits are of vast extent and hundreds of feet in thickness." See also PHILLIPS' *Ore Deposits*, pp. 613–616.

[2] Report on the *Gold Mines of Bolivia* by MINISTER ANDERSON of La Plata, contained in *Special Mint Report* on *Production of Gold and Silver in the United States*, 1891, pp. 102–106.

[3] Large gold-bearing alluvial deposits are found in the Eastern Cordilleras and in the northern region. In the department of Loreto, in the province of Alto Amazonas, many alluvial deposits occur. These were worked for two centuries, but were abandoned in 1867 owing to the attacks of Indians. In the province of Loja large quartz deposits are in sight. The provinces of Pataz and Otuzco are very rich in gold. The streams in the former are uniformly gold bearing.—*Engineering and Mining Journal*, vol. li, p. 71.

[4] *Engineering and Mining Journal*, vol. lviii. p. 532.

[5] In the province of Antioquia, which now produces between three and four million dollars each year, the quartz deposits are exceptionally rich, and a compara-

placers of Venezuela are of considerable extent, and large ore deposits are also found.[1] In British and Dutch Guiana very important deposits occur, and these are being rapidly developed. Only the crudest appliances have hitherto been employed:[2]

NORTH AMERICA.

In Central America, Nicaragua, Costa Rica, and Honduras, there are large deposits, both in quartz and in placers.[3] In Mexico, rich deposits occur in the northwestern, middle western, and southern states. The gold ores of Mexico are generally low grade.[4] Passing to Canada, we find that Nova Scotia contains considerable deposits of quartz as well as rich placers.[5] Exten-

tively small portion has been worked. In the north of this province are vast areas of alluvial deposits which have only been skimmed over. The beds of gold-bearing gravel in the department of Cauca are very extensive. Beds of cement, rich in gold, are also found. Since the abolition of slavery in 1857, the mines in this district have been practically abandoned. In the northeastern part of the province, a district of between 800 and 1000 square miles is covered with glacial drift, much of which is gold bearing.—ROTHWELL, *Mineral Industries*, 1895, p. 634. See also *Engineering and Mining Journal*, vol. liv. p. 377; and *Engineering Magazine*, vol. iv. p. 605.

[1] *The United States of Venezuela. Official Publication for the World's Columbian Exposition*, p. 15. See also *Engineering and Mining Journal*, March 24, 1888.

[2] "From Baruna to Cuini, where identically similar evidences as to placers, and external evidences at least as to a continuous vein of mineral are found, there exists an area of country which will rank in the future with the richest gold producing sections in the world."—*Engineering and Mining Journal*, vol. lxii. p. 30. See also for Guiana, *Handelsarchiv*, August 1891, p. 507; *London Economist*, March 10, 1894; and *Report of the Director of the Mint on Precious Metals in the United States*, 1894, pp. 238–242.

[3] *Engineering and Mining Journal*, vol. liii. p. 277; *Transactions A. I. M. E.*, vol. xx. p, 409; ROTHWELL, *Mineral Industries*, 1896, p. 799; *Report of the Director of the Mint*, 1897, *ibid.*, pp. 252–256.

[4] "Some gold deposits occur in the Sierra Madre. The districts around Oaxaca are very rich in gold," *ibid.*, vol. lviii. p. 107. "The gold belts of Zacatecas is 250 miles long and 100 miles wide. Throughout this district gold-bearing quartz, much of it rich, is found in great abundance." "In Sonora are many silver-gold and gold mines." "In the western portion of Prietas and extending into Sonora is a district which abounds in gold veins, though few of them have been worked to a profit." "North of Alamos are rich deposits." "Near Batopilas in Chihuahua, rich gold deposits were discovered in 1887." "Many rich deposits and mines exist in Durango."—*Ibid.*, vol. lv. p. 74. *Engineering and Mining Journal*, vol. xlix. p. 131.

[5] *Geological Survey of Canada, Division of Mineral Statistics and Mines, Annual Report for 1890*, pp. 55, *et seq.*

sive deposits of both kinds exist in Quebec.[1] Ontario is also rich in gold.[2] The deposits of British Columbia are of great richness. In the Cariboo district extensive placer deposits are found together with rich quartz veins. Large amounts of "drift" deposits are also found. In the Rossland district, large amounts of low grade ore have been worked within the past three years, and in other portions of the province gold is also found in considerable amounts.[3] Finally, the last two years have witnessed extensive gold discoveries in Alaska; and here the indications point to the existence of very large deposits.[4]

The mere enumeration of the localities where gold is yet to be extracted in large quantities, shows the difficulties which stand in the way of the gold miner in these districts. Most of these deposits are situated in barbarous or half-civilized countries, where life and property are insecure. Capital avoids these countries, and yet without large investment of capital progress in gold mining is an impossibility. From some of the richest deposits, those of Russia and China, private enterprise has hitherto been excluded. Climatic difficulties also retard the development. The deposits of the gold coast of Venezuela and the Guianas, for instance, are situated in damp unhealthy districts, and the native labor is in most instances extremely untrustworthy and inefficent. The extreme cold of Siberia and Alaska greatly hinders the development of their gold resources.

[1] "The Beuce auriferous region covers a very extensive area, estimated at 15,000 square miles. Nearly all the river beds of this district contain gold. Numerous quartz veins exist nearly everywhere. The gold-bearing ore is not of a particularly high grade."—J. OBALSKI, *Mines and Minerals of Quebec*, p. 56, *et seq.*

[2] *Engineering and Mining Journal*, July 3, 1897. Mr. T. A. Rickard states that extensive gold deposits appear to be located in the Lake of the Woods District. See also *World's Columbian Exposition Catalogue of Mineralogical Exhibits: Ontario.*

[3] For British Columbia, see *Provincial Bureau of Mines, Bulletin No. 2, Colliery Engineer and Metal Miner*, October 1895; *ibid.*, July 1897; and *Transactions A. I. M. E*, February 1897.

[4] For a discussion of these fields, see the *Engineering and Mining Journal*, vol. lxiv. pp. 422, 425, and 455. See also, WILLIAM OGILVIE, *Information Respecting the Yukon District.*

Perhaps the most serious difficulty is the inaccessibility of the deposits. In hardly any of the districts mentioned can the mines be reached by railroad, or water transportation. This is an almost insurmountable obstacle to their development. Without transportation, only placers and high-grade free milling ores can be worked.

We have no reason to suppose that these conditions will long continue. The rapid advance of civilization in all quarters of the world bids fair to eliminate most of them in the early future, and when these problems are solved there can be no doubt that the world's gold supply will be enormously increased. It should be remembered that only two districts, California and Australia have been thoroughly explored, and yet even their yield shows no signs of diminution. The great number of deposits which have not been touched, and the still greater number where mining has been of the most superficial character, leave no ground for the opinion that the world's gold supply will be seriously contracted for an indefinite future. The development of these regions will be more rapid if the fall of general prices continues and the profits of gold production increase.

EDWARD SHERWOOD MEADE.

THE UNIVERSITY OF CHICAGO.

THE INTERNATIONAL INDEBTEDNESS OF THE UNITED STATES IN 1789.

IT is not necessary to lay stress upon the significance of international credit relations in modern civilization. Students, business men, and politicians, all find in their own particular fields difficult problems arising from these relations. The paramount importance of the general subject lends interest to branches of it that would otherwise be dry and lifeless, sanctions the acceptance of proximate results when nothing more exact can be obtained, and for each particular problem justifies the best possible method of treatment, however poor that may be.

The present article is based on the assumption that the liabilities of one country to other countries can, in general, be better determined by the methods used in ordinary business than by any other process. If we wish to ascertain the indebtedness of an individual or corporation at any given time, we go the records of their dealings with others. The balance that we obtain by the careful study of such records is corrected by comparison with all the evidences of obligation, in the different forms of credit instruments that can be obtained. The result thus obtained is considered practically correct.

In investigating the results of international transactions it will be convenient, as is often the case in private accounts, to divide the period to be investigated into sections.[1]

Before proceeding, it is necessary to understand just what is to be included under the expression, international indebtedness, as here used. There is a large amount of wealth in the United States which residents of England have the right to demand whenever they choose. It is assumed that the value of this wealth at any given time determines the amount of our interna-

[1] The present article is one of a projected series of articles dealing with the international credit relations of the United States.

tional indebtedness to England at that time. When William Waldorf Astor became a resident of London the international indebtedness of the United States was increased by the value of his real estate in New York. When Miss Vanderbilt married the Duke of Marlborough she added the market price of her railroad stocks to that indebtedness. These are but two examples of the numberless ways in which rights to property lying in the United States becomes vested in the residents of other countries. The expression, "International Indebtedness of the United States," is used in this article to signify the sum total of all such rights.

The international dealings of the United States[1] previous to 1700 undoubtedly resulted in a balance of account, and probably in a balance of indebtedness against this country. But the data for ascertaining such balance are few in number, scattered, and of an unsatisfactory nature. Further, the small amount of the balance that would be found after much time spent in gathering and sifting the material, would be insignificant when compared with the larger amounts annually entered in the accounts of the succeeding period (1700–1789). It has, therefore, seemed best to open our ledger with the date 1700. The year 1789 has been chosen as the limit to the present inquiry, for several reasons. In that year the government of the United States began to make official record of at least some part of our international dealings. Up to that time the records are incomplete and very unsatisfactory, and whatever results are obtained must be reached by a free handling of the material, such as could not be excused under more favorable circumstances. Moreover, the greater significance of the balances to be obtained after that date demand that they be determined by more exhaustive search for data, more exact methods in their use, and a more critical scrutiny of the results.

[1] The historically incorrect but much more convenient term, United States, is used throughout the article to indicate those North American colonies of England that have since become the United States.

The systematic treatment of the international dealings of a country render a certain amount of classification of such dealings necessary. Through such classifications we shall have the international indebtedness at any given time, in a number of smaller balances. The most important of these is the balance of trade, meaning by this term the balance resulting from the interchange of commodities, so far as such interchange is a matter of official record.

The only basis for estimating the value of the commodities imported and exported during this period are the official records of the British government. These are quite defective, for the reason that all customhouse returns were made at the valuations of the year 1697.[1] For this, however, it will not be necessary to make allowance in each particular entry, but when the totals have been obtained for the whole period, correction can be made for the probable effect of this system of valuation.

Statements compiled from the original records show that the imports from Great Britain into the United States during this period were as follows:

1700–1780,	£72,490,128[2]
1781,	847,882[3]
1782,	256,324[4]
1783,	1,435,229[5]
1784–1789,	14,011,506[6]
	£89,041,069

There is no official record showing the amount of the imports into the United States from other countries than Great Britain during this period. However, there is a record of the entire

[1] *American State Papers: Class I, Foreign Relations*, vol. ii. p. 412.

[2] SHEFFIELD, *Observations on the Commerce of the American States*, table No. 9, p. 24. See *Ibid.* appendix, p. 278 for the exactness of the figures. Comparison with the official values of exports and imports of Great Britain as given in MACPHERSON, *Commerce*, vol. iii. pp. 351–588 for the decade 1761–1770 indicates that the official valuations, *i. e.*, the market values, of 1697 were used in Sheffield's tables.

[3] MACPHERSON, *Annals of Commerce*, vol. iii. p. 706.

[4] *Ibid.*, vol. iii. p. 727.

[5] *Ibid.*, vol. iv. p. 40.

[6] PITKIN, *Statistical View* (Edition of 1817), p. 30.

foreign trade of the United States for the year 1769 which furnishes a basis, unsatisfactory though it may be, for an estimate of their value.[1] Much as we may dislike to estimate the century's trade on the basis of a report for one year, it is the best we can do. For two reasons, the result obtained probably increases the debit side more than the facts in the case would justify if they could be obtained. In the first place, the proportion of trade done with other nations than England had probably increased during the century; and second, there can be no doubt but the share of the whole import trade which was done with England in 1769, was more or less decreased by the non-importation agreements. The imports from Great Britain for the year were £1,604,975. The imports from all countries during the same time were £2,623,412. Assuming that these figures correctly indicate the proportion between imports from England and the total imports for the entire period, the total amount of merchandise imported into the United States from 1700 to 1789 would be £145,542,086. While we cannot expect this result to be absolutely correct, the attempt to better it by making allowance for the many small causes that might be suggested as affecting it, would be useless labor.

The exports from the United States to Great Britain during the same period were as follows:

1700–1780,	£51,471,840[2]
1781,	99,848[3]
1782,	28,676[3]
1783,	314,059[4]
1784–1789,	5,453,682[5]
	£57,368,105[6]

[1] MACPHERSON, *Annals of Commerce*, vol. iii. p. 571.

[2] SHEFFIELD, *Observations on the Commerce of the American States*, Table IX, p. 24.

[3] *Ibid.* Table XIV.

[4] MACPHERSON, *Annals of Commerce*, vol. iv. p. 40.

[5] PITKIN, *Statistical View*, p. 30.

[6] CHAS. H. EVANS, *Exports from American Colonies*, p. 7. The compilation of Mr. Evans for the United States Government, taken from Macpherson on *Commerce*

The basis for an estimate of the total exports from the United States to all countries is given by tables published by Sheffield and Macpherson. These tables give the following account of the exports for the years 1769 and 1770 :

	To Great Britain.	To all countries.
1769, - - -	£1,531,516	£2,852,441 [1]
1770, - - -	1,650,000	3,330,000 [2]
	£3,181,516	£6,182,441

On the basis thus established for the years 1769 and 1770, the exports from the United States to all countries during the entire period come to £111,794,165.

But in both of these totals there are errors due to their being estimated according to the valuations of 1697. Most of the data for correcting these errors have been found in the correspondence carried on between Mr. Anstey, as representative of Great Britain, and Mr. Rufus King, our minister at the court of St. James, in their discussion of the probable amount owed by the colonists to citizens of Great Britain at the beginning of the Revolution.[3] The imports from Great Britain during the years 1773 and 1774 amounted to £2,578,536, at the official valuation. The same exports, estimated at the declared values of 1800, amounted to £3,963,415. This indicates an increase in prices of imports during the century of about 54 per cent. Mr. Anstey was of the opinion that one-third of this advance had been made in the period before 1773. As he was interested in making the largest possible estimate of the imports, we have reason to suppose that his estimate of this advance could not have been too small. Values for the period from 1780 to 1789,

and HAZARD'S *Commercial and Statistical Register* gives as the total amount of exports to Great Britain, £57,932,441.

[1] SHEFFIELD, *Observations on the Commerce of the American States*, Table No. V.

[2] MACPHERSON, *Annals of Commerce*. vol. iii. pp. 572–3.

The figures for 1770 are given in round numbers for the reason that the table includes exports from Newfoundland, Bahama and Bermuda, which necessitates an estimated correction, based on the table of imports and exports of Great Britain for the same year found on page 518 of Macpherson's *Annals of Commerce*.

[3] *American State Papers, Class I, Foreign Relations*, vol. iii. p. 412.

as given by Mulhall, indicate that not more than two-thirds of the advance in the price of imports between 1697 and 1800 had taken place at that time.[1] Two-thirds of the imports for the whole period had been brought in previous to 1770. From these data it would seem that we should certainly make the charge against the United States large enough if we add 15 per cent. to the total already obtained.

The increase in the price of exports from the southern colonies during the century[2] had been comparatively small. For this reason probably no more than 8 per cent. need be added to the total exports in making the correction. When these corrections are made we have, for the period 1700–1789:

Total imports from all other countries to the United States, -	£167,373,399
" exports from the United States to all other countries, -	120,737,698
Estimated balance of trade against the United States for the entire period, - - - - - - - - -	£ 46,635,701

The balance arising from the ocean carrying trade is generally next in importance to the balance of commerce proper among the component balances that constitute the international indebtedness of a country at any given time. This was undoubtedly the case in the indebtedness under discussion. Mr. Burke called the New Englanders the Dutch of America. They had won this title as carriers for North America, the West Indies, and part of Europe. His appreciation of the magnitude of the ocean carrying trade done by the colonies was not exaggerated. He seems to follow, or perhaps he originated, the tendency to overestimate the part taken in that trade by New England as compared with some of the other colonies. This tendency has somewhat of justification in the fact that the commercial interests of the northern colonies were so predominant as compared with their manufacturing and agricultural interests. This predominance is well shown by the following newspaper clipping: "This morning arrived a ship from Cork loaded with beef, pork and

[1] MULHALL, *Dictionary of Statistics*, pp. 490, 493.

[2] *American State Papers, Class I, Foreign Relations*, vol. iii. p. 412.

butter."[1] A clipping from the same paper commenting on the period we are investigating, indicates the importance of the carrying trade of the United States in general, during that time. It reads: "The American shipping employed in the trade of Great Britain had been a great deal more than one-half as much as the British."[2]

The customhouse records of Great Britain give us no data whatever for the investigation of this branch of the subject. An attempt to determine the amount of the balance resulting from the ocean carrying trade by an itemized estimate of the freights earned by the different parties concerned would be entirely hopeless. It will be our purpose, then, to determine first whether the United States was entitled to a credit or should be charged with a debit on this score.

We may accept the general rule, that the country importing pays the freight. Now, in estimating the balance of trade the debits were reckoned on the valuations of the imports in Great Britain, and under this rule there must therefore be an additional charge against the United States for freight on all such imports as were not carried in American ships. Likewise, the United States has been credited for her exports at their value in Great Britain. So that, contrary to the usual rule, she is also to be charged with the freight on her exports so far as they were not carried by her own ships. In order to establish the proposition that the United States is not to be charged with a debit on account of the ocean carrying trade, we must prove that the colonists were their own freighters, both to and from Europe; or at least that they earned as much freight by carrying goods between other countries as other nations earned in the carrying trade between Europe and America. This is the claim that was set up by Mr. King in his discussion with Mr. Anstey. A comparison of the amount of tonnage owned by different nations during this period, so far as that may be possible, is the only means of determining whether Mr. King was justified in his claim, or whether a greater or less claim should be made

[1] *Independent Chronicle*, June 5, 1783. [2] *Ibid.*, April 13, 1786.

for the United States during the entire period. And, in addition to this comparison, some allowance must be made, if possible, for the different rates of freight earned on the trade carried by each country's shipping.

It is impossible to make a comparison of the shipping owned by the different countries throughout the entire period; the best available substitute is a series of comparisons at different dates within the period. For the purpose of such comparison it is necessary to know the amount of shipping owned, or estimated to be owned, by the United States. There is no official record of this amount except so far as it is included in the reports of the shipping of Great Britain. We are compelled, therefore, to determine the amounts as nearly as possible in each case from the fugitive reports on navigation made by the colonies from time to time, and from any other sources that are available.

The next question, then, concerns the amount of tonnage owned by the United States in 1700, or near that date. The larger part of the few reports at hand bearing on the question indicate only the number of vessels owned, without stating their tonnage. A brilliant exception to this general rule is a report made to the Board of Trade of Connecticut in 1709.[1] This gives the number and total tonnage of each variety of vessels owned. It shows that the average burden of sloops was about twenty-nine tons, of brigantines sixty-six tons. The shallow harbors of Connecticut are probably a sufficient warrant for our assuming that sloops and brigantines owned by other colonies will average at least as large as those of Connecticut. The same report says that there had been no change in the amount of shipping owned in Connecticut during the preceding ten years. It may therefore be assumed that these figures give the tonnage of the colony for 1700 with sufficient accuracy for the present purpose. The bulky nature of their products, especially lumber, led the Americans to make their ships of a comparatively high tonnage. In 1723 Captain James Sterling contracted to build a ship of 700 tons.[2] In 1724 Governor Wentworth reported that a ship of

[1] HINMAN, *Letters.* [2] PALFREY, *New England*, vol. iv. p. 452.

1000 tons was being built in Massachusetts.[1] Ketches are stated by different authorities to vary in burden from 100 to 250 tons. It is quite probable that at this time their average burden would be even less than 100 tons.

The following table has been compiled from the Connecticut report of 1709 and the report giving number, kind, and some notes as to size of ships, made to the Lords of Trade by Lord Bellomont in 1698.[2] The amounts for Lord Bellomont's reports have been estimated as well as possible in the light of the above data.

	Tons.
CONNECTICUT.	
39 sloops,	1,115
3 brigantines,	200
BOSTON.	
25 ships from 100 to 300 tons,	4,000
39 ships from 100 tons and under,	3,000
13 ketches,	1,100
50 brigantines,	3,300
67 sloops,	2,000
NEW YORK.	
6 ships above 100 tons,	900
8 ships 100 tons and under,	700
2 ketches,	170
27 brigantines,	1,800
81 sloops,	2,400
NEW HAMPSHIRE.	
11 good ships,	1,650[3]
4 ketches,	350
5 brigantines,	360
4 sloops,	120
Total,	23,165

The authentic data for estimating the tonnage owned by the other towns in Massachusetts and by the other colonies are very

[1] CHALMERS, *Revolt of American Colony*, vol. ii. p. 34.

[2] *N. Y. Colonial Documents*, vol. iv.

[3] The fact that New Hampshire exported much lumber makes it probable that her ships were of a relatively large tonnage.

meager and unsatisfactory. Rhode Island reported to the Board of Trade in 1708 that they owned 29 sail. It is to be supposed that her shipping had increased more or less during the previous eight years. In 1721 Maryland owned 24 sail of small vessels. In 1729 the shipping of Philadelphia amounted to 6000 tons. The shipping of Virginia took but very small part in the ocean carrying trade. However her governors reported to the home government from time to time that the Virginians owned considerable fleets of small vessels. These would properly enter into our estimate since the same class of vessels will be included in the statistics of shipping owned by other nations. While there are no reports to be found as to the amount of shipping owned in the Carolinas and in New Jersey, we cannot suppose that they owned no vessels. Gloucester, Salem, and other small towns of Massachusetts were already enterprising competitors of Boston in the ocean-carrying trade. Scattered as these data may seem, and uncertain as their character certainly is, they will probably justify the addition of a sufficient amount to the total obtained for Connecticut, Boston, New York, and New Hampshire to bring the estimate of the shipping owned by the United States in 1700 up to 30,000 tons.

It is generally admitted that for several centuries past England has done more than her share of the ocean-carrying trade. It would probably answer the present purpose, therefore, to show a comparison with that country favorable to the United States. Yet, to make the case as strong as possible, the inquiry may be extended to the other leading nations. As regards the shipping of these nations in 1700, there seems to be as complete a lack of statistics as was found in the case of the United States. However, we have statistics for the amount owned in England in 1701–2, and it will be possible by means of these to form some estimate of the ships owned by other European nations. Sir William Petty estimated that in 1666 England owned one-third as much tonnage as all the rest of Europe. It is not probable that this proportion had been materially changed before 1700. Chamber's *Estimates* give the total tonnage of England in 1701–2

as 261,222 tons. Mulhall adopts these figures and says that they include the colonial tonnage; 30,000 is somewhat over one-ninth of the above amount. I therefore assume that the most conservative estimate, as regards the United States, of the comparative tonnage owned by the principal nations of the world at the beginning of the eighteenth century would give to that country one part, to England eight, and to the rest of Europe twenty-seven.

There are no figures to be obtained for the ocean freights, to be charged to the different nations, but it may be assumed that it corresponded roughly to their respective populations. Mulhall gives the population of England in 1680 at 5,532,000, that of the other leading European countries in the same year at 67.5 million, and that of the United States in 1701 at 297,000. So while we have found the tonnage owned compared as 1, 8, and 27, a like comparison of population gives us 1, 20, and 227. But as under the conditions of our problem the freight charges against the United States are double what they would be in ordinary circumstances, these last figures must be changed to 1, 10, and 113.[1] It seems, then, that on a comparison of tonnage and population the United States is entitled at the beginning of this period to a considerable credit, even after making allowance on account of using English valuations for both the export and import account.

A showing not nearly so favorable to the United States as compared with England is obtained by substituting for the figures on population the figures on clearances from the two countries during the years 1714–1717.[2] During that time the clearances from England were in round numbers 440,000 tons a year. During the same period the clearances from New York and Boston were 28,393 tons a year. Now while New York and Boston owned but two-thirds of the tonnage of the colonies, there are many reasons for supposing that more than that proportion of the foreign commerce of the country passed through

[1] See page 33.

[2] *Report of the Board of Trade*, 1721. *New York Colonial Documents*, vol. v.

these ports. Still, though it may be somewhat unfair to the United States, the clearances of the entire country may, for the present purpose, be estimated at one and one-half times those of Boston and New York. This gives us 42,590 tons. The indicated commerce of the two countries, then, would stand in the proportion of 1 to 11, but doubling the burden of the United States it would become 1 to 5½. This ratio, 1 to 5½, compared with the tonnage of the two countries, 1 to 8, gives to England a somewhat greater advantage over the United States as a net freight earner, than the latter country has over England according to the first comparison made, where the charges of freights against the two countries was estimated to stand in the ratio of 1 to 10.

If it be allowable to average the results of the two comparisons, it will appear that the advantage of the United States as a net freight earner is equal to that of England; or, in other words, the credit balance due the United States on account of the ocean-carrying trade was nearly if not quite equal to that earned by England at the same time. It is further to be borne in mind that much of the freighting done by the United States, especially that to the West Indies and to the coast of Africa, was of an exceptionally profitable nature.[1]

It seems fairly well established that at the beginning of the period, the United States must have been earning a net credit from the ocean-carrying trade, still it must be admitted that for the next twenty years their merchant marine had very much to contend with. The wars of the early years of the century and the piracy[2] immediately following probably left the amount of shipping owned in the United States no larger in 1720 than it had been in 1700. Indeed there can be no doubt that in the case of Boston there was a decrease.[3] The fact also that Connecticut reported in 1709 that there had been no increase in her shipping for the ten years previous is good evidence on this point.[4]

[1] WEEDEN, *Economic History of New England.*

[2] WEEDEN, *Economic History.*

[3] *Report of the Board of Trade*, 1721. *New York Colonial Documents*, vol. v. p. 598.

[4] See page 34.

During the eighteenth century the portion of the world's tonnage owned by the United States and England increased from 25 per cent. to 70 per cent.[1] With this in mind, it will probably be unnecessary to carry the comparisons for later dates beyond these two countries. There are no statistics of the amount of tonnage owned by the United States except as included under that of England at any time within this period. Mulhall says that in 1760 England owned 487,000 tons. According to Sheffield her tonnage in 1750 was 609,798 tons and in 1774, 798,864. It would seem from this that on the basis of Sheffield's figures her tonage in 1760 would have been about 680,000. It is probably necessary to allow something for exaggeration in Sheffield's figures, but it would seem that most of the difference between this amount and the 487,000 tons reported by Mulhall must be accounted for by Mulhall's excluding and Sheffield's including the tonnage owned by the United States. We are at least warranted in inferring from these figures that that tonnage exceeded 100,000 at this time.

There are many bits of stray information that strengthen such an inference. In 1730 Rhode Island owned 5000 tons.[2] In 1741 Newport alone had a fleet of 120 sail.[3] If we assume that these vessels were of the average tonnage usually counted at that time they would amount to 7200 tons.[4] Her progress from that time up to the Revolution was very remarkable. Her merchants were enterprising and prosperous. It is worth notice that a large number of Jews were found among them. In the year 1769, 200 vessels were employed in her foreign trade, and she owned between 300 and 400 of smaller craft which were engaged in fishing and the coasting trade. In 1764 Providence owned 54 vessels. This period moreover was one of remarkable development in the towns of Massachusetts. Between 1721, the time at which the average burden of vessels had been reck-

[1] MULHALL, *Dictionary of Statistics.*

[2] GREEN, *Rhode Island*, p. 149.

[3] *Rhode Island Colonial Records*, vol. v. p. 12.

[4] *New York Documents*, vol. v. p. 598.

oned at 40 tons, and 1760, there had been a decided increase in the size of the ships built.[1] All this taken together would seem to indicate that Rhode Island owned as much as 25,000 tons in 1760.

According to a very interesting table published in a Philadelphia newspaper of 1774, the foreign trade of that colony had so developed that it amounted to nearly twice that of all New England.[2] Mr. Proud, the historian of that state, claims that the Pennsylvanians built and owned the principal part of the shipping employed in this large trade. The official records of Pennsylvania show a registration of tonnage in that state from 1762 to 1774 that gives good support to this claim. In the light of this evidence, and in consideration of the fact that as early as 1729 Boston owned 40,000 tons of shipping,[3] it hardly seems possible that the combined shipping of Massachusetts and Pennsylvania could have been much less than 100,000 tons in 1760.

Baltimore, though not ranking so high as a trading point then as it does now, had its men who had grown rich in the shipping business. Maryland claimed that Richard Bennett, one of her ship owning planters, was the richest man in the colonies. Ship building was a very profitable business in that state before the Revolution. She had given her home-built ships an advantage in regard to port fees which enabled them to carry the most of her foreign trade.[4]

New York City had shared, in some degree, in the general progress. In 1749 the shipping owned there amounted to 6406 tons and was increasing rapidly.[5] It is claimed that the commerce of South Carolina was handled to a very large extent by natives of the state or those who afterwards became its citizens.[6] The tonnage owned by Connecticut in 1774 amounted in round numbers to 10,000 tons.[7] According to the report of the Reg-

[1] WEEDEN, *Economic History*.
[2] PROUD, *History of Pennsylvania*, p. 272.
[3] LINDSAY, *History*, vol. ii. p. 226.
[4] SHARF, *History of Maryland*.
[5] BERTHOLD FERNOW, *Narrative and Critical History of America*, vol. v. p. 228.
[6] RAMSEY, *History of South Carolina*.
[7] *Connecticut Colonial Records*, 1774.

ister of Shipping for the colonies in 1769 the output of Connecticut's ship building industry was one-thirteenth of all the ships built in the colonies.[1] Now if we suppose that ship owning was in proportion to ship building, the total tonnage owned in the colonies in 1774 must have been in the neighborhood of 130,000 tons. The data here presented do not justify a claim in behalf of the United States for this or any other definite amount of tonnage. It may be considered sufficient, however, to warrant the statement that during all the middle part of the period under consideration the total tonnage of the merchant marine of the United States was from one-fourth to one-third as great as that of Great Britain. Estimating the total commerce of the United States from 1760 to 1770 by the same method that has been used for the period as a whole, it appears that its amount was in round numbers 48 million pounds sterling. Macpherson's tables show that the foreign trade of Great Britain during the same time amounted to 277 million pounds. In other words, we may say that while the ocean freight bills to be charged to the two nations, were as one to three, their freight earning capacities were as one to three and one-half.[2] That is, nearly as large a part of the American, as of the British merchant fleet could be devoted to net freight earning.

An attempt to gather exact figures on this question from the imperfect records of the jumble of events that make up the history of the last fifteen years of the period 1775–1789 would be fruitless. Fortunately for the discussion, certain broad facts pertinent to the question stand out in bold relief. During the Revolution the ordinary legitimate commerce that had previously been carried on by the colonists was almost destroyed. It follows from this that the ocean freight bills to be charged to them were exceedingly small. Their shipping on the other hand was engaged in a freight carrying business in which they received the entire cargoes in payment. The enormous profits of privateering were shared by the Tories as well as the

[1] MACPHERSON, *Annals*, vol. iii. p. 571.

[2] In this estimate the United States is charged double rates. See page 33.

patriots.[1] It is true that this business was carried on at an enormous expense in the loss of ships, but this debit item will more properly be considered under the discussion of the results of the ship building industry.

During the last seven years of the period the freight bills of the United States were undoubtedly very largely increased. Moreover in these years the freights earned were decreased considerably by the restrictive legislation of England. But this was also a time when extraordinary profits were made in voyages to China and the East Indies, and in circumnavigating the globe.[2] The inducements offered by the ocean carrying trade, as a whole, were of such a nature that the shipping of the United States had been increased to 202,000 tons in 1789.

The facts brought out in the above discussion probably warrant the conclusion that the Americans were not only their own ocean freighters, as claimed by Mr. King, but that they were also entitled to a considerable international credit for ocean freights, and as the result of privateering, throughout almost, if not quite, the entire period. No attempt will be made to express in dollars and cents the amount of this credit; but there are counterbalancing debits of a like indefinite nature to be offset against it.

One of the most considerable exports of the United States found no place in the customhouse records of Great Britain. Successful as the Americans seemed to have been in navigating ships their skill and natural advantages in building them were still more remarkable. The aptness of the people of New England was noticed by Josiah Child as early as 1680. He was undoubtedly correct in his estimate of their ability. During the eighteenth century the United States probably sold more ships to people of other countries than any other nation. That ardent friend of the colonies, Mr. Burke, tells us that the New England merchants were accustomed to build ships and take them loaded

[1] On this Revolutionary commerce see WEEDEN, *Economic History of New England*, chap. xx.

[2] WEEDEN, chap. 22.

with colonial produce to southern Europe. There they sold their cargoes and did a freighting business until they were able to sell the ships. They carried away the proceeds of the entire transaction in bills of exchange on London. Mr. Sheffield in writing of the conditions about 1770 says: "America had robbed us, at least for a time, of a corn trade that sometime ago brought in to us as much as almost any article of export; and she was rapidly robbing us of the ship-building business."[1] Again he says: "At the conclusion of former wars, many of the numerous artificers in the different branches of ship building, as well as our sailors, were discharged; and almost all the merchant ships employed in this country were built in America, and our artificers and sailors were obliged to go there and to different foreign states for employment."[2]

In 1721, Massachusetts was making about 6000 tons a year and selling the most of it to England and the West Indies.[3] There were forty-three sail on the stocks in Boston at one time in 1736,[4] and as many as 164 at one time in 1741. Boston built forty-one topsail vessels in 1738, but the number had decreased to fifteen in 1749.[5] The average tonnage of these vessels in both the latter years was over 150 tons. Now it does not seem possible that over one-half the tonnage built at that time in Boston could have been in vessels averaging over 150 tons burden, for the average tonnage of the whole British marine fifty years later was only 106 tons per vessel. But if it was not, Boston must have built over 12,000 tons in 1738. It can hardly be doubted that throughout a very large part of this period Massachusetts must have averaged over 7500 tons a year. Very few facts can be ascertained in regard to the production in other colonies. Ships of their own building were a principal item in the payment for imports by the citizens of Rhode Island.[6] Ships were one of the principal exports from the colony of New

[1] SHEFFIELD, *Observations*, p. 98. [2] *Ibid.*, p. 99.

[3] *New York Colonial Documents*, vol. v. *Report of the Board of Trade.*

[4] WEEDEN, *Economic History of New England*, p. 612.

[5] *Ibid.*, p. 651. [6] *Report of Governor Ward*, 1734.

Hampshire,[1] and we have already noted several instances of remarkable activity in the ship-building industry in other colonies.[2] In the years 1769, 1770, and 1771 Massachusetts built but a trifle over one-third of the entire output of the colonies.[3] The entire product of the colonies during these years averaged between 21,000 and 22,000 tons.

These facts, taken together, probably warrant the assumption of an average annual output of 15,000 tons, or a total of 1,050,000 for the first seventy years of the period. It is not to be supposed that in the remaining years of the period, they could have exported any considerable amount of shipping. Different authors note their activity in ship building during and after the Revolution, but it is to be remembered that besides making good the ravages of the English during the war, it was necessary for them, in order to obtain the 202,000 tons they owned in 1789, not only to make good the usual decay in shipping but also to increase their probable tonnage from before the war by about 50 per cent.

What part of the production of 1,050,000 tons previous to 1770 did the colonists require to keep up their own shipping? We have estimated the amount of such shipping at the beginning of the period to have been about 30,000 tons, and near its close about 130,000 tons. For the present purpose we may assume their average holding for the seventy years to have been the average of these two figures or 80,000 tons. Then if we suppose that this tonnage had to be replaced four times previous to 1770, which is rather an extreme supposition,[4] we have the demand of the colonists during that period fixed at 320,000 tons. This gives 730,000 registered tons as the amount available for export during the period. Thomas Irving, Inspector General and Register of Shipping,[5] and other authorities of that time add one-third to the registered tonnage to obtain the real

[1] BELKNAP, *History of New Hampshire.* [2] See p. 36.

[3] MACPHERSON, *Annals of Commerce*, vol. iii. p. 571.

[4] See as to average life of ships. W. W. BATES, *American Marine.*

[5] MACPHERSON, *Annals of Commerce*, vol. iii. p. 571.

tonnage. It is probable, therefore, that the total exports amounted to at least 900,000 tons. A large part of this was sold in the West Indies and in southern Europe at a considerable profit above cost of production. To determine what the average cost of production was is a very difficult matter. Sheffield, in a note that appears to have been prepared with some care, says that the cost of vessels built and equipped in the colonies varied from £7 10s. to £10 10s.[1] Weeden says that prices were sometimes as low as £3, but if the contracts upon which such statements are based, are investigated it will be found that they were either for bare hulls or that some part of the materials were furnished.[2] The data at hand seem to warrant the assumption of £10 per ton as the lowest probable price for the whole export, and the placing of nine million pounds to the credit of the United States as the result of such exports previous to the year 1789.

No unimportant item in determining the international indebtedness of a country are the losses and gains of the individuals who engage in international business. No method has been discovered even in our own time for making the facts concerning these items amenable to record or systemization. The most that can be hoped therefore in regard to them is that it may be possible to present facts in sufficient number and of such a character as to justify an opinion regarding the general results. Governor Hutchinson's presentation of the way in which trade was carried on between the two countries will be helpful.[3] In the earlier part of the century the English merchants and manufacturers had shipped freely to America on commission. The losses on such ventures became so general that anyone who embarked in the business was counted as on the sure road to failure. Later the manner of doing business was improved. The English merchants, acting as middlemen, guaranteed the home manufacturers against loss. They also furnished capital to the New England merchants and received in payment a commission on

[1] SHEFFIELD, *Observations*, p. 163, n. [3] HUTCHINSON, *History of Massachusetts*.
[2] SMITH, *History of Newburyport*, p. 72.

the goods exported. Interest was charged on accounts after they had been running from six to nine months. Bad debts were probably not more frequent at that time in America than in England. We learn from the Amory manuscript letters[1] that in 1720, "European goods generally sell at 700 per cent. profit." A large part of this profit is undoubtedly to be accounted for by the depreciated currency, and according to Mr. Hutchinson somewhat more than the remainder was required in the early years of the century to counterbalance the losses from bad debts, while in later years they went into the pockets of the Americans to a considerable extent. It may be worth while to note that in 1709 prices in some places were at least three times as high in the colonial as in sterling money.[2] This would have reduced the 700 per cent. quoted above to a very modest profit indeed.

Merchants and manufacturers were not the only ones who suffered on account of the difficulty of making collections in America. The vicissitudes of the real estate speculator and the man who loaned money on real estate security are well illustrated by the sale under execution, at £200, of a New York farm that had formerly sold at £2,700.[3] Booming new towns was at one time a profitable occupation of the thrifty Marylanders, and English capitalists furnished no small part of the profits made in this occupation.[4]

Discreditable though it may be, there can be no doubt that a considerable amount of the colonial international indebtedness was balanced by the outlawing of accounts. Sheffield claims that in the period just preceding the Revolution almost three-fourths of the London merchants trading with America were bankrupt on account of poor collections. Those trading with Maryland and Virginia suffered most in this respect. Indeed there would seem to have been considerable ground for a London dispatch published by the *Independent Chronicle* in 1786, which claimed that there had been no large fortunes made by English merchants in the American trade before the Revolution. It is

[1] WEEDEN, p. 574.
[2] *North Carolina Colonial Record*, vol. i. p. 715.
[3] *New York Colonial Document*, vol. vii. p. 175.
[4] SHARF, *History of Maryland*.

also true that many of those who found America a good place to make money in also found it a good place to live in, and instead of taking back their gains, brought all their fortune to America.

The data here presented only suffice to show that the profits made by English capital in the American colonies, though it was unquestionably very considerable, was probably not so large as is commonly supposed and was in a very great degree offset by losses. In fact it may be assumed that these net profits were very nearly if not quite counterbalanced by the earnings of the American shipping.

The expenditures on account of the British and French armies in America during the eighteenth century, which added a very considerable credit item to the international account of the colonies, still remains to be considered. Sheffield furnishes much interesting information on this subject.

By the war of 1739, which may be truly called an American contest, we incurred a debt of upwards of -	£31,000,000
By the war of 1755 we incurred a farther debt of -	71,500,000
And by the war of the Revolt we have added to both these debts nearly - - - - - - -	100,000,000
And thus we have expended - - - - -	£202,500,000

a larger sum in defending and retaining our colonies than the value of all the merchandize which we have ever sent them, we have in a great measure, disbursed this enormous sum, to secure the possession of a country that yielded us no revenue.[1]

France sent (not included in the debt) [*i. e.*, the national debt of the United States] above £600,000 in specie to America, being obliged to send cash, finding her bills, for a long time, from 20 to 30 per cent. below par whilst bills on London were at the same time above par in Philadelphia and Boston. Towards the close of the war, French bills, from the punctual payments of the preceding draughts, rose nearly to par; . . . . It has been asked, What has become of the money we have sent, during the war, to America? Very little money was officially sent to America after the first year or two of the war; during that period, those who had the contract for supplying the army with gold, sent out a great quantity of Portugal coin; but finding the charge of insurance and freight lessening the value of the contract, it was

[1] SHEFFIELD, *Observations*, p. 301.

contrived to supply the army without sending more specie than was just required to give the contractor's agents the command of the exchange which was done by sending small quantities occasionally . . . . those agents, in different parts of America, drew upon the contractors in favor of such persons as had occasion to make remittances to England; so that, in fact, our army, on the other side of the Atlantic, was paid and supported by our manufactures instead of money, which, in some measure, may account for the apparent ease with which such expensive operations were carried on, and for the little specie that seems to be in circulation where so much expense has been incurred.[1] . . . . no resource is left the Americans at this time for specie, but our fleet and army at New York.[2]

Again, as to the expense of England in America in time of peace. "Before the year 1755 the expense of our establishment in America was £70,000. From the peace of 1763 to the time of the stamp act, it was £370,000 yearly."[3] In this connection it will be interesting to note what Lord Sheffield has to say as to the revenues afforded the home government by the American colonies. "In the time of her greatest prosperity the money which America raised was trifling." "The customs from the 5th of January 1766, when the board was established to 1775, when the trouble began, amounted to £290,000 in a little more than seven years; out of which the expense of collecting it is to be deducted. The only other revenue was the quit-rents, which were never tolerably paid, except in the south, and barely defrayed the expense of collecting."[4]

From time to time parliament made donations to different colonies or grants in compensation for services rendered by them. Appropriations of this nature amounting to at least £341,000 were made in 1761 and 1762.[5] Pennsylvania received £80,000 for expenses during the French war.[6] At another time £115,000 was granted to the colonies north of Pennsylvania for the same purpose.[7] Scattered all through the colonial documents and the records of the historical societies, many items may be found

[1] SHEFFIELD, *Observations*, p. 208, n.
[2] *Ibid.*, p. 211, n.
[3] *Ibid.*, p. 245, n.
[4] *Ibid.*, p. 245 and n.
[5] MACPHERSON, *Annals of Commerce*, vol. iii. pp. 346-360.
[6] SHEFFIELD, *Observations*, p. 245.
[7] *New York Colonial Documents*, vol. vii. p. 1.

concerning the constant drain of funds from the home government to America. Under the date of December 10, 1763, Jasper Manduit writes that a compensation of £42,700 has been paid Massachusetts for expenses in 1761.[1] The Lords of Trade recommended an appropriation of £120,000 to reimburse the colonies for expenses in 1755.[2] Cadwallader Colden in a letter claims that the colonists made a great deal of money by furnishing supplies to the French army during the French and Indian war.[3] The attempt of Parliament to introduce the pitch tar industry in New York and the other northern colonies, seemed to be a success only as a means of drawing expense money, supplies and salaries, for Hunter, Badger, and others, from the national treasury. The account of these experiments forms an important part of the history of New York in the early part of the century.[4] Governor Hunter, alone, expended £32,144 on the Palatines. The letters of the elder Pitt to the colonies give an expression concerning the great amount of money that the home government is about to raise for expense in the colonies which fully harmonizes with the retrospect of Sheffield on the same subject.[5] He gave the colonies to understand that all they might spend in prosecuting the French and Indian war would be reimbursed. To bring together from the original records all the items of expenditure of the European nations in their operations in North America during the eighteenth century would be a work of years.

The items that have been presented would seem to indicate that Sheffield's more moderate claims were not beyond reason. Guided somewhat by them it may be estimated that these expenses for the first half of the century, including the expenses in Queen Ann's war, average £50,000 a year, or a total of £2,500,000; for the next twenty-five years, including the French and Indian war, an average of £200,000 a year, or a total of five million pounds and that the expenditures of the English and French

[1] *Massachusetts Historical Record*, vol. vi. p. 191.

[2] *New York Colonial Documents*, vol. vii. p. 1.

[3] *Ibid.*, vol. vii. [4] *Ibid.*, vols. iv and v. [5] *Ibid.*, vol. vii.

armies furnished exchange enough to pay for two-thirds of the imports into the colonies during the seventies, or in round numbers 15 million pounds. If this estimate of 22.5 million pounds for governmental expenses is too small, it is quite possible that its defects in that respect are balanced by an excess of the profits on foreign capital and net expense for marine insurance, above the earnings of the American shipping, which have so far been balanced against each other. Leaving out these compensating items we have as a result of our discussion, the following statement:

The United States in account with all other countries — 1700-1789.

DEBTOR.		
To balance of trade, - - - - - - -		£46,635,701
CREDITOR.		
By balance from ocean carrying trade,	£ 9,000,000	
By expenditures of foreign governments, - - - - -	22,500,000	£31,500,000
		£15,135,701
International indebtedness of the United States in 1789		$75,000,000

This amount must receive one final correction before it is presented as the result obtained through the investigation of the records of the international transactions of the period. In the discussion of the losses and gains of foreign capital, the extremely profitable investments in those evidences of state debt which were afterward exchanged for United States government securities, were not taken into consideration. Various references found in the Congressional Debates[1] give some light on these transactions. Mr. Lawrence drew attention to the fact that Pennsylvania had made such certificates legal tender at par to creditors residing within the British lines. He said that British creditors had received large sums of these certificates at their nominal value. These had afterwards been exchanged for a like amount of the registered debt which was still held by foreigners. Mr. White said that Holland had purchased five million dollars of

[1] *Annals of Congress*, I Congress.

the domestic debt. Mr. Boudinot spoke of certain conditions, but not of the prices of a purchase amounting to three million dollars The only transactions mentioned by these gentlemen were those in which very large quantities were bought. The facts that foreign investors had such an amount of claims against individuals as has already been indicated, that they were in many cases very anxious to realize upon them as has been shown by quotations from Sheffield and others; and that during the years 1783-1789 these public securities could, at times, be obtained at from 10 to 15 per cent. of their face value; all warrant the inference that investments of this kind in smaller quantities, must have been very considerable. Moreover, Mr. Pitkin tells us that the foreign holdings of the domestic debt of the United States, in the first years of the nineteenth century exceeded 30 million dollars.[1]

These considerations are assumed to warrant the addition of five million dollars to the amount indicated by the statement of account and 80 million dollars is presented as the result of the first step in the process of investigation suggested at the beginning of the article. The second step — the testing of the result obtained by comparing it with all evidences of international indebtedness on the part of the United States existing in 1789 — is next in order. But the invoicing of international credit relations is still an art of the future, and to undertake anything of the kind for the year 1789 would be futile. Nevertheless a rude test of a composite nature may be attempted. According to the report of the Register of the United States the indebtedness of the national government to foreign governments in 1789 was over 12 million dollars. The amount of old obligations of the colonists incurred before the Revolution, which were assumed by the government through a convention with Great Britain, amounted to nearly three million dollars.[2] Now it is not an extreme presumption to suppose that in this last amount we have all the pre-revolutionary obligations that were not outlawed or otherwise canceled during that eight years of disturbance. A

[1] PITKIN, *Statistical View*, p. 333.

[2] *American State Papers:* Class 1, Foreign Relations, vol. ii. p. 383.

rude computation of the balance of trade for the years 1784–1789 may now be undertaken:

Imports from Great Britain 1784–1789 (see page 29),	£14,000,000
Imports from all countries obtained by adding 50 per cent. (page 30),	21,000,000
Increase on account of the valuation of 1697 (pp. 31–32),	7,000,000
Real value of total imports 1784–1789,	28,000,000
Exports to Great Britain 1784–1789 (page 30),	£5,500,000
Exports to all countries in accordance with page 31,	11,000,000
Increase on account of the valuation of 1697,[1]	3,500,000
Real value of total exports 1784–1789,	14,500,000
Imports, 1784–1789,	£28,000,000
Exports, 1784–1789,	14,500,000
Balance of trade 1784–1789,	13,500,000
Cr,	$67,500,000
Acknowledged indebtedness at the close of the Revolution,	15,000,000
Balance of international indebtedness thus indicated	$82,500,000

This test indicates that the amount first found is too small, and at the same time it suggests that the defect is due to underestimating the effect of the use of valuations of 1697 in computing the total imports of the period.[2] A well-known item, operating in the other direction, the export of specie during these years has not yet been taken into consideration. No satisfactory data have been found on which to estimate its amount, but it is probable that it is quite sufficient to counterbalance the error revealed by the test.

On the basis of the foregoing inquiry it seems probable that the international indebtedness of the United States in 1789 was not far from 80 million dollars. This result is not presented as a final or authoritative settlement of the question involved. Such a settlement, if it is ever reached, will have to be the work of

[1] *American State Papers:* Class I, Foreign Relations, vol. ii., pp. 383, 412, 413.

[2] Page 31.

many hands. Indeed, the particular figures in which the result of this inquiry have been expressed are not of primary consequence. It is more to the point if the method adopted approves itself as an effective method of discussing international accounts. By resolving the general question of international indebtedness into a series of component problems, it is hoped that any considerable error in the account will come to light, and so suggest its own correction.

WORTHY P. STERNS.

UNIVERSITY OF CHICAGO.

THE FUNDAMENTAL LAWS OF ANTHROPO-SOCIOLOGY.[1]

ANTHROPOLOGY is destined to revolutionize the political and social sciences as radically as bacteriology has revolutionized the science of medicine. Although the phenomena of social organization and development proceed in accordance with definite laws, these laws have for the most part eluded the grasp alike of theorists and of investigators, so that today, the very conception of a science of sociology and of a corresponding art of social control, excites skepticism and even ridicule. Much insight has, it is true, been gained in relation to economic phenomena; but the science of economics confines its scope to one phase—and that only a secondary phase—of social development, and the correlative art of increasing material well-being probably but hastens the decadence of the nation and the deterioration of the racial stock. The application of anthropology to the solution of the problems of social development promises more significant results. It furnishes a scientific explanation of the historical development of civilizations, by showing them to depend upon the processes of biological evolution; it certainly suggests sombre prospects for the future, but not beyond human control and bettering.

The importance of the ethnic factor in society—which anthropo-sociology seeks to ascertain and demonstrate—is not altogether a new conception. On the contrary, it has been too often exploited in a vague and arbitrary fashion, and has been sometimes twisted to conform with theories rather literary than scientific. There are indeed those who regard the conception as having already outlived its usefulness. Thus one of my critics, better versed doubtless in metaphyics and literature than in modern science, asserts that these ethnic theories have been

[1] Translated by Carlos C. Closson.

already interred with Taine. This remark indicates that my learned critic has read no one of the works that he criticises—neither my *Sélections sociales* nor Ammon's *Natürliche Auslese beim Menschen*, nor any of the authorities cited in these books, nor any of the literature of the subject that has since appeared.[1]

I shall not attempt to recount the discoveries which have led

[1] The fundamental works on the subject are: OTTO AMMON, *Die natürliche Auslese beim Menschen*, Jena, 1893, and LAPOUGE, *Les Sélections sociales*, Paris, 1896. The bibliographies they contain should be supplemented by the titles of the following recent publications:

LAPOUGE, "Recherches anthropologiques sur la problème de la dépopulation," *Revue d'économie politique*, 1895, pp. 1002–1029; 1896, pp. 132–146. "Indice céphalique des conscrits du Canton de Rennes," *Bulletin de la Société scientifique et medicale de l'Ouest*, 1896, pp. 90–98. "Corrélations financières de l'indice céphalique," *Revue d'Economie Politique*, 1897, pp. 257–279.

ODIN, A., *Genèse des grands hommes*, Paris, 1895.

UJFALVY, *Les Aryens*, Paris.

LIVI, *Antrometria militare*, Roma, 1896.

COLLIGNON, "Anthropologie du Sud-Ouest de la France," *Memoires de la Société d'Anthropologie de Paris.*

AMMON, *Die Gesellschaftsordnung*, Jena, zweite Auflage, 1896; "Die Geschichte einer Idee," *Rundschau der Deutschen Zeitung*, vol. i. Nos. 185, 186, 190, 192, 196, 197; "Die Arierdämmerung," *ibid.*, vol. ii. Nos. 27, 28, 33, 34; "Die wirthschaftliche Leistungsfähigkeit der drei weissen Rassen in Frankreich," *ibid.*, vol. ii. Nos. 109, 118; "Die Menschenrassen in Europa," *Tägliche Rundschau*, 1896, 133–155; "Fortschritte der Anthropologie und Sozial Anthropologie," *Naturwissenschaftliche Wochenschrift* vol. ix. no. 20.

CLOSSON, "Dissociation by Displacement," *Quarterly Journal of Economics*, vol. x. pp. 157–186; "Ethnic Stratification and Displacement," *ibid.*, vol. xi. pp. 92–104; "Social Selection," JOURNAL OF POLITICAL ECONOMY, 1896, pp. 449–466; "Recent Progress of Social Anthropology," *ibid.*, 1896, pp. 410–412; "La dissociation par déplacement," *Revue internationale de sociologie*, 1896, pp, pp. 511–537. "The Hierarchy of European Races," *American Journal of Sociology*, November 1897.

CHALUMEAU, *Influence de la taille humaine sur la formation des classes sociales*, Genève, 1896; "Les races et la population suisse," *Journal de statistique suisse*, vol. xxxii. p. 4.

RIPLEY, "Ethnic Influences in Vital Statistics," *Publication of the American Statistical Association*, 1896, pp. 18–40; "The Form of the Head Influenced by Growth," *Science*, N. S., vol. iii. p. 838; "The Racial Geography of Europe," *Popular Science Monthly*, beginning in February 1897.

FERRARI, "Studio critico di antropologia e sociologia," *Riforma sociale*, vol. vi.

WILSER, *Auslese und Kampf ums Dasein*, Karlsruhe.

PAULA, *Revue Scientifique*, 1896, vol. ii. p. 13–18.

NOVICOW, *L'Avenir de la race blanche.*

to the application of the methods of ethnical analysis to the problems of history and sociology. The progress of the movement is already recorded, so far as may be at the present time, in Ammon's *Die Geschichte einer Idee*. I shall merely mention here some of its phases most essential to an understanding of the subject. At the origin of every discovery there is usually one man of genius. The originating genius of anthropo-sociology was the Count de Gobineau. His *Essai sur l'inégalité des races humaines* appeared in 1853–1855. A second edition, published in two volumes in 1884, proves that the work did not fail to attract attention.[1] Gobineau, however, has not been widely read, and the few who have borrowed his ideas have for the most part failed to acknowledge their indebtedness. Gobineau was no scientist, but a wide traveler and a man of erudition and reflection. His fundamental idea was the superiority of the blond race. He showed that this race was more widely extended in antiquity, that it had constituted the intellectual and military aristocracy in the most flourishing epoch of former civilization, that its gradual disappearance or absorption by crossing had been followed by the decline and fall of the nations it had controlled. Not only is his demonstration of the influence of race and of racial purity upon the destiny of social groups in accord with history, but also his conception of race conforms to that of zoölogy and is rigorously scientific. His formulation, with the scanty data then available, of the laws of the evolution of peoples is indeed a work of genius. Anthro-sociology dates from the *Essai sur l'inégalité*.

Gobineau probably did not suspect that his fundamental idea could be formulated in figures. The first to work out a statistical demonstration of the unequal aptitude of different races in the same environment was Durant de Gros, one of the great originators of modern hypnotic science and a pioneer in many fields of thought. In an essay before the Anthropological

[1] [A partial translation of the first edition was published in the United States in connection with the ante-bellum controversy as to the racial position of the negro.—Translator's note.]

Society of Paris in 1868[1] Durant brought to the attention of his colleagues the differences in respect to the prevailing form of the head (as indicated by the cephalic index[2]) between the urban and the rural population of the department of Aveyron.[3] He cited also similar differences between the educated and the uneducated elements among the urban population of Rodez. The author of this important discovery committed at the time the error of seeking for an explanation of the phenomenon he noticed in a supposed tendency of urban life toward dolichocephaly; but, continuing to meditate on the significance of the facts, he, at about the same time as Ammon and myself, reached the true explanation—the working of selection.[4]

Calori observed later in Italy the same difference in cephalic index between urban and rural population.[5] In 1881 Jacoby pointed out very clearly the selective influence of cities in attracting the superior elements, but did not treat the matter from the point of view of racial selection.[6]

The establishment of anthro-sociology as a distinct branch of investigation dates from my lectures at the University of Montpellier (1886–1892) and from the publication by Ammon of his researches on the conscripts of Baden.[7] In the last few years specialists in various countries have pursued this method of investigation, and already a very considerable literature has appeared.

I shall not attempt to discuss here the conclusions drawn by various selectionists from facts established by their anthropo-

[1] "Excursion anthropologique dans l'Aveyron," *Bulletin de la Société d'Anthropologie*, 1869, p. 193.

[2] The "cephalic index" is the ratio of the breadth of the head to its length. It is found by dividing the breadth $\times 100$ by the length. Thus, for example, a head 186^{mm} in length and 152^{mm} in breadth would yield an index of 82.1.

[3] The particular arrondissements cited were Rodez, Villefranche, Milhan, and St. Affrique.

[4] This is shown by manuscripts which Durand has kindly placed at my disposal.

[5] *Archives pour l'anthropologie*, vol. xvi. p. 274.

[6] *Études sur la sélection*, Paris, 1881.

[7] *Anthropologische Untersuchungen ueber die Wehrpflichtigen in Baden*, Hamburg, 1890.

logical researches. I shall rather attempt to formulate the laws which seem to result from a synthesis of the available data, indicating the limits within which they have so far been verified, and illustrating each of them with some examples, taken sometimes from the standard works on the subject, but more often from the less easily accessible essays scattered through various journals, or, again, from unpublished manuscripts. The exposition of these laws, most of which are here formulated for the first time, may make rather difficult reading. My excuse must be that the introduction of interesting details would make the exposition of excessive length. I ought, perhaps, to offer an excuse in another respect. As the general reading public, thanks to our superannuated system of education, however well instructed it may be in ancient languages and other comparatively useless branches, is comparatively ignorant of such sciences as anthropology, I am compelled to supply explanations that may seem to some unnecessary.

We will begin, then, with some observations on the anthropological races of Europe.[1] The two ethnic elements which predominate in Europe were designated by Linnæus, *Homo Europæus* and *Homo Alpinus*, respectively. The first is the tall, light-haired, blue-eyed race, long of head (dolichocephalic[2]) and long of face, of which the best type is the Anglo-Saxon or the Scandinavian—an ambitious, energetic, and courageous race. The second is the shorter, brunette race, round of head (brachycephalic) and face, of which the type is found in the Alps and the

[1] The word "races" in the anthropological sense has nothing in common with the word as ordinarily used by politicians and writers when they speak, for example, of the "Latin races," the "Slavic races," etc. The principal difference is that races in the first sense exist, while "races" in the second sense do not.

[2] In this article the terms dolichocephalic and brachycephalic are used in the general sense as describing or contrasting the two types of head form. They are often employed in a more technical and definite sense as a part of the following terminologies: In the terminology of Topinard the term dolichocephalic indicates indices from 65 to 69; sub-dolichocephalic from 70 to 74; mesaticephalic from 75 to 79; sub-brachycephalic, 80 to 84; brachycephalic, 85 to 89. Of other terminologies the best is dolichocephalic = 70 to 74; sub-dolichocephalic = 75 to 79; sub-brachycephalic = 80 to 84; brachycephalic = 85 to 89.

Haute Auvergne—a cautious, unprogressive race, strongly attached to its native abode. After the manner of Spencer's and Schaeffle's analogy between the social organism and the physical body, the first race might be compared to the nerve cellules and the second to the muscular cellules. It is common to designate *Homo Europæus* as the "Aryan race," because he has been supposed to have descended from the Aryans of Bactria; and, although the inverse relation is now established (since the "Aryans" appear to have formed one branch of this race), the use of the two terms so roughly synonomous may be tolerated. Some antiquated anthropologists still designate *Homo Alpinus* by the term Celto-Slav, under the mistaken notion, originated by Broca, that *Homo Alpinus* predominated in Slavic countries and among the Celts of Cæsar. In reality the Celts and Slavs were of the blond race—*Homo Europæus*. The term Celto-Slav is therefore to be avoided.

In the south of Europe, diverse secondary elements are mingled with these two principal races. For lack of a better classification they have been grouped under the common caption of the Mediterranean type. The principal element among them is very dark, short of stature, long of face and head—the Mediterranean type in the proper sense, the inhabitant of Corsica, Sardinia, and southern Italy. But there are other types, also, called Mediterraneans, such, for example, as the Kabyles, with short faces. Add to these races the Semites of Arab origin, especially in the north of Africa and in the Orient, and add, again, as one advances northward in Asia, an ever-increasing proportion of *Homo Asiaticus*, yellow skinned, dark of hair and eye, dolichocephalic in the pure state, but often very brachycephalic from an ancient crossing with the so-called *Acrogonus* type; which last appears to have played a rôle also in the ancestry of *Homo Alpinus*.

Homo Europæus predominates in Great Britain and among the English colonists everywhere, in northern Germany, Holland, Scandinavia, and the United States. *Homo Alpinus* predominates in France, Switzerland, southern Germany, Austria,

Poland, northern Italy, the Balkan peninsula, Asia Minor, and the Caucasas.

Bohemia, the middle region of the Danube, and Russia are peopled by various combinations of *Homa Europæus* and *Homo Alpinus*. Southern Italy is given over to the Mediteranean type. Spain is inhabited by Mediterraneans, with an admixture of *Homo Europæus*. This last ethnic composition is characteristic also of Chile, Uruguay, and the Argentine, but in Mexico, Peru, Bolivia, and Venzuela it is absorbed by the predominating indigenous population. The north of Africa is inhabited by a mixture of Mediterranean, Aryan, and Semitic stocks.

In the hierarcy of races the first place must be given to *Homo Europæus* (the dolichocephalic-blond or so-called Aryan),[1] while *Homo Alpinus* (the bracycephalic type) and the Mediterranean probably rank in the order named.

The laws which we shall have to consider concern the respective position and relation of the three races with reference to social status and with reference to migration and choice of domicile. We shall see in operation, for instance, a process of social stratification in which the several races come to occupy a social or political position, each more or less distinct from the others. Again, we shall see in operation a process of geographical displacement of one of the three races — a movement that may take the form either of the abstraction of that race from a given community (by emigration to foreign countries) or of its concentration in certain localities within the community (as by migration from the country to the cities).[2]

In the countries where the principal elements of the population, between which our comparisons will be drawn, are *Homo*

[1] This conception of the relative worth of the different races was developed by Gobineau. His theory, however, of the formation and breaking up of social groups laid stress on only two factors in the process — conquest and intercrossing of races, thus overlooking many forces of social selection, the working of which we can now discern.

[2] For a fuller discussion of the significance of stratification and displacement as processes of selection, see CLOSSON: "Dissociation by Displacement," *Quarterly Journal of Economics*, January 1896, and "Ethnic Stratification and Displacement," *ibid.*, October 1896.

Alpinus and the dolichocephalic race, we may safely accept the cephalic index as a decisive and convenient means distinguishing between the two races. It must not be inferred that any mystic significance is attached to the relative length and breadth of the head; but the form of the skull indicates the racial pedigree of the individual, and whether in the race or the individual a correlation exists between the psychological character, the cerebral structure and the form of the skull.[1] In countries, on the other hand, where the brachycephalic is wanting and where the comparison is between the dolichocephalics, whether of the same or of different races, the cephalic index is no longer useful, and it is necessary to find in the coloration or in the special morphology a means of distinction which is sufficiently constant and sufficiently decisive as between the different ethnic elements.

With these explanations we may proceed to a consideration of some of the more important laws of anthropo-sociology.

LAW OF THE DISTRIBUTION OF WEALTH.

In countries inhabited jointly by Homo Europæus and Homo Alpinus, the former element possesses more than its proportionate share of wealth.—Our first illustration of this law is from France. The following tables give a most significant comparison of the economic efficiency of the two races, as indicated by their respective taxpaying capacity. The first table presents a comparison between the most dolichocephalic departments of France so grouped as to include 10,000,000 inhabitants, and the most brachycephalic departments so grouped as to include an equal number of inhabitants:

[1] [One critic has said that "it is as impossible to infer the psychological character from the form of the skull, as to judge the accuracy of a clock from its external form." But if the exterior of the clock is so marked that we may thereby determine its make, we may usually draw inferences as to its probable accuracy. Now, the head form, as expressed by the cephalic index, is a sign of the hereditary and racial *make* of the individual, and so indirectly an indication of his probable psychological character. As in the case of the clocks, the external mark is not necessarily a perfect indication in every individual instance, but may be accepted as a safe guide in the average of a considerable number of cases.—Translator's note.]

	Year	Group of the most dolichocephalic departments embracing 10,000,000 inhabitants francs (,000 omitted)	Group of the most brachycephalic departments embracing 10,000,000 inhabitants francs (,000 omitted)
Taxes on land (unimproved property)	1896	17,725	29,891
" " personal property	1896	26,485	13,227
Door and window tax	1896	17,239	8,581
Taxes on transfers of property	1894	59,312	33,667
" " bequests	1894	7,378	4,801
" " inheritances	1894	70,920	32,923
" " leases and pledges	1894	3,663	1,288
Mortgage taxes	1894	2,473	1,166
Stamps (ordinary, etc.)	1894	15,920	11,113
Stamps on receipts	1894	14,430	2,497
Stamps proportioned to amount involved in transaction	1894	8,485	2,123
Tax on beverages	1894	186,229	79,969
" " tobacco	1894	122,926	84,471
" " bicycles, etc.	1894	643	386
Receipts of Departments	1892	76,307	68,519
" " Communes	1893	399,790	109,485
Octroi	1893	191,077	28,609
Indebtedness of Communes	1893	2,271,260	373,447

The greater taxpaying capacity of the dolichocephalic population as indicated by the above table is certainly striking; but in order to realize the full weight of the figures it is necessary to take account of two considerations: First, the group of ten million dolichocephalic population is embraced in only thirteen departments, whereas the ten million brachycephalics make up the population of thirty departments; this difference in the extent of area covered explains the sole case, that of taxes on land, in which the brachycephalic group pays a larger revenue to the government. Secondly, the dolichocephalic group includes Paris, but even if one excludes the city, the tax-yielding capacity of the remaining seven million dolichocephalics is about equal to that of the ten million brachycephalics.

The following table gives a similar comparison between the tax yield of the twenty most dolichocephalic departments and that of the twenty most brachycephalic departments.

	Year	The twenty most dolichocephalic departments francs (,000 omitted)	The twenty most brachycephalic departments francs (,000 omitted)
Taxes on land (unimproved property)	1896	28,096	21,491
" " personal property	1896	33,470	9,566
Door and window tax	1896	21,636	6,055
Taxes on transfers of property	1894	74,731	24,172
" " bequests	1894	9,206	3,572
" " inheritances	1894	94,099	23,225
" " leases and pledges	1894	4,444	935
Mortgage taxes	1894	3,001	853
Stamps (ordinary, etc.)	1894	21,060	7,938
Stamps on receipts	1894	15,912	1,869
Stamps proportioned to amount involved in transaction	1894	9,621	1,667
Tax on beverages	1894	209,882	55,933
" " tobacco	1894	160,028	58,422
" " bicycles, etc	1894	868	283
Receipts of Departments	1892	103,142	46,572
" " Communes	1893	449,458	78,500
Octroi	1893	209,928	21,167
Indebtedness of Communes	1893	2,563,405	270,835

The above tables demonstrate the economic, and especially the commercial, superiority of *Homo Europæus*. The departments with the lower average indices are more densely populated, much more wealthy, much more active; property therein is more valuable, industry, more flourishing, commerce especially much more considerable; the financial needs of the community are more extensive, and in consequence the public indebtedness is greater; the more active and progressive character of the people is shown even by the more general use of the bicycle.[1]

This law applies also in Switzerland, in Germany, in Austria, but the diversity within each of these countries of the political organization and of the basis of taxation, renders demonstration more difficult. The law explains for example a phenomenon much discussed of late by German journalists. In the Grand Duchy of Baden, an official inquiry looking toward a reform of

[1] For a more detailed study of these financial statistics see LAPOUGE, "Corrélations financières de l'indice céphalique." *Revue d'économie politique*, March 1897.

mortgage taxation developed the fact that the Catholic precincts are the most heavily encumbered with mortgages on rural property, the Protestant precincts the least heavily burdened; as shown in the following table:

The 18 precincts least encumbered showed	55%	Protestants,	45%	Catholics.
The 17 precincts moderately encumbered showed - - - - - - -	34%	"	66%	"
The 17 precincts most encumbered showed	9%	"	91%	"

This result is significant for the anthropo-sociologists, and especially for Ammon and myself, because Catholicism is characteristic of brachycephalic populations (France, South Germany, Austria, Poland), and Protestantism of dolichocephalic populations (England, Holland, Scandinavia, North Germany). It is then the brachycephalic communities of Baden that are least independent financially. The law of the distribution of wealth is equally applicable to Spain and Italy, but here the demonstration becomes still more difficult, because allowance must be made for the prevalence of the Mediterraneans who cannot be distinguished by the cephalic index from *Homo Europæus*, but whose aptitude is much less. It would then be necessary for an exact demonstration to compare the economic efficiency of the different ethnic elements as distinguished not only by the cephalic index but also by the index of nigrescence. In default of this more exact comparison, we will content ourselves with one based on the cephalic index as the means of ethnical analysis. This in itself furnishes results sufficiently striking. The northern part of Italy is populated by a mixture of *Homo Europæus*, of brachycephalics, and of Mediterraneans; in the southern part of Italy, the last named element becomes the predominant one in the population, whereas the first named almost disappears. We may then select in the north a group of the most brachycephalic provinces, together with a group (about equal in population) of the most dolichocephalic provinces. The dolichocephalic group will be in some measure representative of the element *Europæus*. Again we may select in the south two similar groups, one of the most brachycephalic prov-

inces, the other of the most dolichocephalic. But in this case *Homo Europæus* is absent from both groups, and the dolichocephaly of the last named indicates the more general predominance therein of the Mediterranean element. The following table shows the amount of taxation in four groups of provinces thus constituted. The first group comprises the most brachycephalic provinces of northern Italy (indices above 85); the second group, the most dolichocephalic provinces of the same region (indices from 84.1 to 82); the third the most brachycephalic provinces of the south (indices from 81.7 to 80); and the fourth the most dolichocephalic of the southern provinces (indices from 79.7 to 78.5):

Class of Taxes 1894	Northern Italy		Southern Italy	
	The most brachycephalic provinces francs (,000 omitted)	The most dolichocephalic provinces francs (,000 omitted)	The most brachycephalic provinces francs (,000 omitted)	The most dolichocephalic provinces francs (,000 omitted)
Tax on land	17,228	11,154	17,379	14,118
Tax on buildings	10,875	14,307	9,295	9,589
Tax on personal property	16,968	25,346	9,910	10,096
Inheritance tax	7,097	6,904	3,527	4,184
Registration fees	8,409	8,866	7,366	7,681
Total	60,577	66,577	47,477	45,668

In the north the dolichocephalic group, notwithstanding the fact that it is slightly weaker numerically,[1] shows the higher tax-paying capacity. On the other hand, of the two southern groups, the provinces containing the larger proportion of brachycephalics yield rather more taxes than those containing the larger

[1] The four groups are constituted as follows: (I) Torino, Novara, Cuneo, Sondrio, Belluno, Padova, Treviso, Forli, Ravenna, Reggio Emilia, Pesaro, aggregating 4,680,000 inhabitants; (II) Porto-Maurizio, Genova, Brescia, Firenze, Grosseto, Livorno, Lucca, Massa, Pisa, Pavia, Arezzo, Ascoli, Macerata, 4,516,000 inhabitants; (III) Siracusa, Trapani, Girgenti, Potenza, Foggia, Bari, Caserta, Benevento, Avellino, Campobasso, Aquila, 5,022,000 inhabitants; (IV) Cagliari, Sassari, Palermo, Messina, Catania, Caltanissetta, Reggio Calabria, Cosenza, Catanzaro, Lecce, 5,038,000 inhabitants.

proportion of dolicho-Mediterraneans. The economic inferiority of the Mediterraneans is more clearly brought out by a comparison of the low yield of taxes in the southern provinces where this race predominates, as compared with the two northern groups.[1] It is to be remarked that the brachycephalics in Italy, as in France, are characterized by the large part which land (unbuilt property) plays among their possessions.

In the countries where *Homo Europæus* predominates, wealth is in general the greatest (England, the United States, Holland, etc.). It is possible, however, that the law would not be applicable as between the most dolichocephalic and the least dolichocephalic elements within such communities, for a comparison between such elements would be a comparison not so much between *Homo Europæus* and *Homo Alpinus* as between different degrees of dolichocephaly among the former racial element.[2] This question, however, is an open one and in general the correlation between economic capacity and cephalic index appears to have a greater degree of universality than the law of wealth distribution as above stated would imply; for the most dolichocephalic portions of India (Bengal) and of China are also the richest.

LAW OF ALTITUDES.

In regions inhabited jointly by Homo Europæus and Homo Alpinus, the former is concentrated in the lower levels.—In the continent of Europe, the habitat of *Homo Europæus*, approximately coincides with the quarternary alluvial belt of the North Sea and the Baltic. The anthropological map may be almost superposed upon the geological. In France the Aryan element is mainly localized in the plains of Flanders, of Artois, and of Picardy, and in the lower valleys of the rivers; toward the south it becomes rare at elevations of more than 100 meters, yet it pre-

[1] For a further discussion of this point the reader may be referred to Closson: "The Hierarchy of European Races," *American Journal of Sociology*, September 1897.

[2] *Cf.* CLOSSON, "Dissociation by Displacement," *Quarterly Journal of Economics*, January 1896; "Ethnic Stratification and Displacement," *ibid.*, October 1896.

dominates up to that altitude in the valleys of all the streams flowing into the Mediterranean Sea. Reciprocally, what may be called the axes of brachycephaly, coincide with the lines dividing the watersheds of the rivers. The principal axis starts from Galicia, follows the mountain ridge to the middle of the French Pyrenees, rejoins the central plateau, embraces the main body of the Alps, and then divides; one branch follows along the backbone of the continent by the Black Forest, the mountains of Bohemia, and the high land which forms the dividing line in Russia. At this end the axis ends in a vast enlargement covering Poland and the surrounding regions. The other branch rejoins by the Balkans the great brachycephalic area of Asia Minor. Secondary branches follow, one the chain of the Apennines to about the center of the range, another the dividing line between the watersheds of the Loire and the Seine, another the chain of the Vosges with an enlargement in the east of Belgium, and still another, the mountain chain of the Balkan peninsula. It is worthy of remark that the maximum of brachycephaly does not coincide exactly with the crest of the chains, but lies to the north or to the west according to the orientation of the ranges.

In the mountain region of France the cephalic index closely corresponds with the altitude. In the less elevated regions, the degree of brachycephaly is often considerable at an elevation of 100 meters; it is very marked in Britainy in the mountains of Arrée and still more in the upland region designated as the Switzerland of Normandy. When a river in its lower course or even close to its mouth cuts through a range of hills, the inhabitants of the bordering country are almost always more brachycephalic than those of the country along the middle course of the stream and of the delta. As instances of this may be cited the Rhone, the Hérault, and the Loire.

The law of altitudes is subject to one exception in France; the region of Limoges and that of Perigueux, although of rather high altitude, are populated in large proportion by *Homo Europæus*. It is probable that these populations represent Gallic

elements driven from the plains by a second band of conquerors and crowded back into the hills. The exception of the plains of Poland, occupied by brachycephalics, is doubtless susceptible of an equally simple explanation. The law may be subject to further local exception because of the counter influence of the law of internal colonization; thus, for example, according to Chalumeau, the dolicho-blonds have colonized the hitherto uninhabited upper valleys of the Alps.

The law is not applicable in England nor, generally speaking, in Spain, because of the absence of the brachycephalic element. In Spain, however, the rule holds good as regards the coast chain of the north. In Italy, and in Corsica where the two elements contrasted are the brachycephalic and the Mediterranean, the former is often found in the lower, the latter in the higher altitudes. Livi gives a table of indices[1] according as the chief place of the mandamento or district is above or below 400 meters in altitude. The lower country is less dolichocephalic in Sicily, in Calabria, in Basilicata, in Abruzzes, in Campania; but in all northern Italy the rule holds good.

The law of altitudes has a wider applicability than the above statement of it implies. The axis of brachycephaly continues in Asia, through Asia Minor, Armenia, the plateaus of central Asia, Tibet, Mongolia, Manchuria and even to Bering Strait, with an important branch descending into Indo-China. So, also, in America the great axis of the Cordilleras is in the main an axis of brachycephaly; and the high plateaus of Mexico, Peru, Bolivia, and Patagonia are brachycephalic. Again, Ujfalvy, studying the mountaineers of the north of Pamir, has found that the brachycephaly of the people increases with the altitude of their habitat.[2] It is probable that a study of the rest of the world made with the same care that has been bestowed on western Europe would make possible a wide generalization with reference to the parallelism of cephalic index and altitude.

[1] *Antropologia militare*, p. 85.

[2] Thus the average index of the Maghians and Karatéghinois is 84.68, while that of the Faûs, Falgars, and Kehtonts is 87.02.—UJFALVY, *Les Aryens*, p. 388.

LAW OF THE LOCALIZATION OF CITIES.

Important cities are almost always located in the dolichocephalic regions or in the least brachycephalic parts of brachycephalic regions.— In France, Toulon, Marseilles, Nîmes, Montpellier, Narbonne, Bordeaux, Limoges, Bourges, Tours, Reims, Paris, Arras, Lille, Havre, etc., conform to this law. Toulouse and Lyons are in the least brachycephalic parts of brachycephalic regions. St. Etienne is in the center of a region of maximum brachycephaly, but the existence of this city is artificial and its location is due to the presence of mineral deposits. Rennes and Mans are decided exceptions to the law. In Beligium and Germany almost all the urban centers conform to the law ; cities situated like Munich in brachycephalic regions are in the least brachycephalic part thereof. In Austria, Vienna and all the principal cities appear to conform to the rule. It is the same also in Russia. In Italy, Turin forms the principal exception, but Milan, Florence, Rome, and Naples are in the most dolichocephalic regions or the least brachycephalic parts of brachycephalic regions. In Spain, with the exception of Malaga, all the important cities, Madrid, Barcelona, Cadiz, Alicante, Valencia, Cardona, Grenada, Valladolid, Saragossa, etc., are located in accordance with the law.

This law is not confined to the large cities; it extends, subject to more frequent exceptions, to the smaller cities and even to the villages. In the absence of any reason to the contrary, the principal center of population in each geographical unit tends to coincide with the center of the lowest cephalic indices.

This law appears also to be of wide application. The largest cities of India and China are in clearly dolichocephalic regions, and wherever are found the remnants of great cities in countries now tending to brachycephaly, the population of former times appears to have been more dolichocephalic. In America the greatest cities are in the regions inhabited most exclusively by dolichocephalic elements, whether English or Spanish, and urban development is more characteristic of the United States and of the Argentine than of countries like Mexico and Peru where the

indigenous elements still form a great part of the population. The great cities of Oceanica are the urban centers of dolichocephalic Aryan populations.[1]

This law of the location of cities seems to point to a law of the greater density of dolichocephalic populations, but the law in this last form has not been so clearly established. It is obviously closely connected also with the law of altitude and with the law of the distribution of wealth.

LAW OF URBAN INDICES.

The cephalic index of urban populations is lower than that of the surrounding rural populations.—The first formulation of this law was made by Durand de Gros in 1869, in the department of Aveyron. He gave the following figures: Rodez, index of rural population 86.2, of urban population 83.2; Millau, rurals 85.8, urbans 84.1; Villefranche, rurals 88.4, urbans (insufficient number of subjects) 75.5; St. Affrique, rurals 83.4, urbans 82.2. In investigations running from 1887 to 1890, I found that the same law was applicable to the small cities of Hérault: Clermont, rurals 84.4, urbans 79.5; Lodève, rurals 82.3, urbans 79.7; canton of Limel 83.3, city of Limel 82.1, city of Marsillargues 81.3. Since 1890 numerous documents bearing upon the urban concentration of dolichocephalics have been published by Ammon, Livi, Weisbach, and Oloriz. As regards France, researches of Dr. Collignon and myself have proved the general applicability of the law, and have yielded figures for a number of localities.

The department of the Seine, that is Paris, has, according to the latest researches of Collignon, an index of 80.9; Seine et Oise has an index of 81.4; the surrounding departments have indices varying from 81.3 (Eure) to 83.1 (Loiret) but nearly all of them are between 82 and 83. The Seine is, moreover, one of the most dolichocephalic (the seventh in order) departments of France.

[1] New Zealand shows the lowest average cephalic index of any Anglo Saxon population.

In the southwest of France, Collignon has shown that the law applies to most of the cities of importance; Limoges, Périgueaux, Bordeaux, la Rochelle, Bayonne, Tarbes, Auch, Mont de Marsan, Pau. The difference between the rural and the urban index is usually about two units: Bordeaux, rurals 81.8, urbans 79.5; la Rochelle, rurals 82.3, urbans 81.4; Pau, rurals 84.1, urbans 82.1; Bayonne, rurals 82.4, urbans 80.5; Tarbes, rurals 86.8, urbans 85.0. A more detailed study of Bordeaux and its suburbs gives the following suggestive results:

Cities		Index	Difference
City of Bordeaux,		79.58	
Suburbs	Blanquefort,	80.63	1.05
	Pessac,	80.90	1.32
	Créon	81.54	1.96
	Carbon-blanc,	82.00	2.42

In Bordeaux 60 per cent. of the subjects had indexes below 80, in the suburbs 32 per cent.

In the west of France the following cities also may be cited as exemplifying this law: Niort, Nantes, Rennes, Angers, Laval, le Mans, St. Malo, Contances, Cherbourg. At Rennes, as shown by my latest researches, the difference between the rural and the urban indices is about two units: 100 rurals of the canton of Rennes gave an average index of 84.7, 67 urbans of Rennes an index of 82.8. In central France the law has been verified for Clermont, Bourges, Orleans, and Nevers; and it is equally applicable to Lyons. In the east may be cited Besançon, Mâcon, and Grenoble, and in the south, Marseilles, and Narbonne, in addition to the cities already mentioned in Hérault and Aveyron.

In the Grand Duchy of Baden, the extensive researches of Ammon show a similar difference between urban and rural indices: for Karlsruhe the index of the rurals is 83.0, that of the urbans is 81.4; at Freiburg the indices are respectively 83.6 and 80.8; a similar difference is found in the case of Mannheim, Lörrach, Heidelberg and Tauberbischofsheim. The following tables show more clearly the difference in the ethnic composition of the urban and of the rural populations:

Cities	Per cent. of Indices below 80 among	
	the Urbans	the Rurals
Mannheim	43.4	34.8
Heidelberg	37.5	17.9
Karlsruhe	33.0	13.0
Lörrach	25.8	21.4

Cities	Per cent. of Indices of 85 and above among	
	the Urbans	the Rurals
Mannheim	10.4	14.5
Heidelberg	4.6	25.4
Karlsruhe	16.5	32.9
Lörrach	25.8	28.8

The following tables may also be given indicating the absolute dimensions of the head among the urbans and rurals respectively:

Cities	Length of Head			
	Per cent. 19cm and above among		Per cent. less than 18cm among	
	Urbans	Rurals	Urbans	Rurals
Mannheim	30.7	27.1	12.1	14.2
Heidelberg	38.2	26.8	14.6	15.9
Lörrach	33.9	29.5	4.8	13.7

Cities	Breadth of Head			
	Per cent. 16cm and above among		Per cent. less than 15cm among	
	Urbans	Rurals	Urbans	Rurals
Mannheim	3.2	4.9	46.1	35.7
Heidelberg	5.5	11.4	36.1	19.4
Lörrach	14.5	19.1	12.9	21.5

For the rest of Germany and for Austria, we have only fragmentary data, which, as far as they go, confirm the results obtained in France and Baden. The following table presents

the case of Vienna in a way analogous to that in which a preceding table presented the case of Bordeaux:

Cities		Index	Per cent. of Dolichocephalics
High Austria,		82.7	20
Low Austria,		82.2	25
City of Vienna,		81.2	37
Suburbs	Bruck,	81.7	32
	Baden,	81.8	31
	Sechshaus,	81.8	32
	Heruals,	80.8	34
Country villages,		83.8	10

In Switzerland researches are still in progress but the law is already verified as regards Geneva, Baden, and Zurich.

Italy presents a curious instance. The statistics based upon the measurements of nearly 300,000 soldiers make possible a most comprehensive comparison so far as regards the localities covered, but unfortunately the importance was not understood in time of distinguishing in each center of population between the natives and the immigrants from the country. We must therefore be content with a comparison in each province of the district (mandamento) which includes the chief center of population with the other districts of the province. This comparison is embodied in the following table:

Provinces	Indices of the	
	District which includes the chief place	Other districts of the province.
Salerno	83.8	82.7
Bari	82.4	80.7
Foggia	80.5	80.3
Lecce	78.1	78.4
Potenza	82.6	80.8
Catanzaro	79.4	78.5
Cosenza	77.9	77.9
Reggio Calabria	80.0	79.0
Caltanissetta	79.5	79.4
Catania	80.8	79.7
Girgenti	80.3	80.1
Messina	79.8	78.8
Palermo	79.5	79.1
Siracusa	81.2	80.6
Trapani	80.4	80.0
Cagliari	80.5	77.2
Sassari	78.6	78.1

Provinces	Indices of the	
	District which includes the chief place	Other districts of the province
Alessandria	84.6	84.9
Cuneo	86.7	85.8
Novara	85.4	86.2
Torino	85.6	86.5
Genova	82.1	82.4
Porto-Maurizio	81.8	82.2
Bergamo	84.2	84.3
Brescia	82.6	83.3
Como	84.2	84.7
Cremona	83.8	84.9
Mantova	83.8	85.3
Milano	83.8	84.3
Pavia	84.3	84.1
Sondrio	86.1	85.7
Belluno	85.5	85.2
Padova	84.8	85.3
Rovigo	84.2	84.6
Treviso	85.4	85.2
Udine	84.2	85.0
Venezia	83.8	85.0
Verona	82.7	84.4
Vicenza	84.7	85.0
Bologna	83.9	84.5
Ferrara	84.4	84.8
Forli	86.0	85.9
Mondena	84.1	85.0
Parma	83.2	85.0
Piacenza	83.6	84.9
Ravenna	86.7	86.7
Reggio Emilia	85.0	85.3
Arezzo	84.1	83.9
Firenze	81.7	83.1
Grosseto	84.6	83.0
Livorno	79.9	79.6
Lucca	78.0	79.7
Massa	78.7	80.3
Pisa	81.2	82.7
Siena	83.4	83.8
Ancona	83.2	84.0
Ascoli Piceno	82.3	83.1
Macerata	83.7	83.2
Pesaro	85.3	85.6
Perugia	85.0	84.1
Roma	79.9	81.0
Aquila	81.9	81.0
Campobasso	80.8	81.6
Chieti	83.4	83.3
Teramo	81.0	81.6
Avellino	82.5	81.4
Benevento	81.2	81.1
Caserta	81.3	81.8
Napoli	82.6	82.6

A study of this table will show that the law is verified in the case of the most important cities: Turin, Milan, Venice, Genoa, Florence, Rome, and in general also in the case of the secondary cities of northern Italy, but that in the south, where the Mediterraneans become more and more the predominant element in the population, the urban indices are higher rather than lower than the rural. On the basis of this table, Livi and Ripley have held that the law of urban dolichocephaly is not verified in Italy, but that the data are to be interpreted as simply showing that the urban populations, as compared with the rural, are more representative of the populations of the country over, and tend therefore to approximate more nearly to the average index. This interpretation, however, is clearly untenable; the average index of the 300,000 soldiers from all parts of Italy is 82.63, so that the indices of Rome, Florence and Genoa (which might be supposed to be the most representative cities) are below this general average index as well as below the index of the surrounding regions. Ripley's attempt to generalize this alleged explanation is especially unfortunate; in France all the great cities where data are as yet available show indices not only below the surrounding regions, but also below the national average, thus the index of Paris is two units, and that of Bordeaux three units, lower than the general index of France. Ammon and Closson have presented another explanation which is in accordance with the law but seeks to extend it to include in the comparison of races in this respect not only *Homo Europæus* and *Homo Alpinus*, but the Mediterraneans as well. They have held that the Mediterranean element is in general social capacity, and especially in the capacity for urban life and pursuits, inferior to both of the others, and that where the population is mainly composed of brachycephalics and Mediterraneans, the cities will draw rather on the former element and will therefore show the higher index.[1] This theory is a tenable one,

[1] See for a presentation of this view, CLOSSON: "Ethnic Statification and Displacement," *Quarterly Journal of Economics*, October 1896; "The Hierarchy of European Races," *American Journal of Sociology*, November 1897. AMMON, *Die Geschichte einer Idee.*

but the slightly higher indexes of the urban populations in the south can be explained more simply. The provinces which were united under the domain of the house of Savoy received a considerable immigration from Piedmont of functionaries and those following in their train. These Piedmontese came from a more brachycephalic part of Italy and were doubtless more brachycephalic than the average population of the south. From the nature of their occupation they were stationed mainly in the urban centers. It is then very possibly the fact that their descendants enter in some proportion into the ethnic composition of urban populations in southern Italy that makes these urban populations more brachycephalic than the rural. Were this exceptional factor absent, these cities would probably conform to the general law. It is necessary, however, in this and in many other cases, to take account (1) of the law of the intellectual classes, which we will presently examine, and (2) of the following modification of the law that we are now considering.

Every city whose sphere of attraction embraces brachycephalic regions tends (other things being equal) to become more and more brachycephalic, although the migrants drawn to it are less brachycephalic than the average of the rural population from which they come.— For example, Montpellier, which receives a large immigration from Cévennes and Aveyron, yields the following indices: urbans 81.6, surrounding rural population 81.6. The two groups thus show an exactly equal index. But until within a very recent period, the city was more dolichocephalic than the suburbs; and within another short period it will be decidedly more brachycephalic. It tends to take the index of the emigrants from the highlands, which index is lower, indeed, by two or three units than that of the populations from which they come, but higher than that of the population immediately surrounding the city. The relation between the cities of southern Italy and Piedmont is exactly parallel with that between Montpellier and Aveyron.

In Spain, the city of Madrid yields an index of 77.8, the province of Madrid, exclusive of the city, an index of 78.6. In

the case of Barcelona, the figures are respectively 77.6 and 78.3. The difference in each case is very slight. In fact the law appears not to apply to Spain, nor to England, nor indeed to any country in which the element *Alpinus* is unrepresented. It appears to hold good always as between *Homo Europæus* and *Homo Alpinus;* to apply only in limited degree as between *Homo Alpinus* and other ethnic elements; and lastly either to be without application or to be compensated by other laws (such as the law of intellectual classes) in case of a homogeneous population of Mediterraneans or of a homogeneous population of *Homo Europæus*.

This law of urban indices is in close dependence upon (1) the law of emigration, (2) the law of concentration, (3) the law of urban elimination, and (4) the law of the intellectual classes.

LAW OF EMIGRATION.

In a population in process of dissociation by displacement, it is the less brachycephalic element which emigrates.— In a large way, colonial populations formed by migration are less brachycephalic than the populations of the mother countries. In Algeria, 234 individuals of French antecedents yielded an average index of 79.2; excluding some doubtful cases, 174 individuals descended entirely from French colonists, yielded an index of 80.9, inferior by two units to the general average index of France, 82.8. The index of the Italians resident in Algeria is about 78, the average index of Italy is 82.7. Lajard obtained from fifty skulls of Spanish Creoles of the Canary Islands (males) an index of 74.5; Oloriz gives as the average index of the skulls of Spaniards 76.45.[1] Lajard obtained from twenty skulls of Portuguese Creoles of the Azores an index of 73.5; Ferraz de Macedo gives as the average for 494 skulls of Portuguese 75. Ripley has obtained from measurements of students of the Massachusetts Institute of Technology the following average indices: First year students 78.6; second year students 77.7; third year students 77.7; fourth year students 77.2.

[1] The average index of the heads of living subjects is 78.1.

These indexes may be compared with those of the educated classes in Great Britain: For England 78.5, for Scotland 77.3. Data for a comparison between the masses in America and in Great Britain are lacking, but it is significant in this connection that New Zealand presents the lowest index so far as known of any Anglo-Saxon country.[1] In the Caucasus, the Cossacks of Konbau have an index of 82.1; the inhabitants of "Little Russia" from which they came have an index of 82.9. The Cossacks of Terek have an index of 81.1.

These data furnish so far only an indirect proof of the law; they show the descendants of emigrants to be more dolichocephalic than the home population, from which we infer that the original emigrants themselves were more dolichocephalic than the average of the populations they left behind. Direct proof is obtained by measuring in a given locality migrants from various regions, and by comparing their indices with those of the regions from which they came. For example, a series of 108 subjects measured in the department of Hérault gave an index of 82.34 as against 83.40, the average index of the depart-

[1] [In comparing the English with the American indices it is, of course, necessary to remember that the latter are doubtless somewhat raised by the presence of other than Anglo-Saxon elements among the American population, and that if only subjects of English antecedents were included, the indices would probably be materially lower than for the home country. At the same time, it is still an open question how far this and the other laws will be found to apply to a population where the element *Alpinus* is so nearly absent as in Anglo-Saxon populations. De Lapouge himself has pointed out this probable limitation in the case of the law of urban indices (see pp. 85 of this article). In this connection I may quote from an earlier article of my own: "The degree of universality with which the law of the greater mobility of the dolichocephalic elements may be found to apply in different countries, is a question of great interest. . . . Will the law hold good, for example, in countries where the mass of the population is of the dolichocephalic type, as for example in England and the United States? We have seen that where the two elements are present, the brachycephalics are stationary as compared with the relatively dolichocephalic; but it does not follow necessarily that these latter are more stationary than the still more dolichocephalic element common among the population of England, or in other words, that the migratory disposition continues to increase as the cephalic index falls. There is indeed some reason for thinking that, on the contrary, the migrants belong pre-eminently to a sort of intermediate type."—"Dissociation by Displacement," *Quarterly Journal of Economics*, October 1896. *Revue Internationale de Sociologie*, July 1896. —TRANSLATOR'S NOTE.]

ments of their origin. The detailed comparison is embodied in the following table:

Departments of origin	Number of subjects	Index of subjects (migrants to Hérault)	Index of department of origin
Gers	3	82.25	85.71
Ariège	6	82.59	82.89
Pyrénées Orientales	8	81.80	78.63
Aude	8	79.08	81.05
Tarn	11	80.04	83.72
Aveyron	25	84.04	85.50
Lozère	11	87.13	87.87
Ardêche	5	83.40	85.24
Gard	24	82.43	83.12
Vaucluse	3	80.27	81.53
Bouches-du-Rhône	4	82.77	82.22
	108	82.34	83.40

A similar series of 128 subjects measured in the department of the Bouches-du-Rhône gave the following results:

Departments of origin	Number of subjects	Index of subjects (migrants to Bouches-du-Rhône)	Index of department of origin
Var	33	81.70	84.45
Alpes-Maritimes	30	81.80	84.22
Vaucluse	35	81.18	82.55
Basses-Alpes	30	83.42	85.00
	128	82.02	84.05

Another parallel series of 97 subjects measured in the department of Ille-et-Vilaine is embodied in the following table:

Departments of origin	Number of subjects	Index of subjects (migrants to Ille-et-Vilaine)	Index of department of origin
Côtes-du-Nord	21	83.0	83.6
Finistère	27	81.3	82.0
Morbihan	21	82.8	82.1
Loire Inférieure	11	84.0	83.8
Manche	8	82.5	83.1
Mayenne	9	82.1	84.1
	97	82.6	83.4

Ammon has found the same results in Germany. Livi is occupied with researches which will determine how far the law applies in Italy.

LAW OF MARRIAGES.

The cephalic index of the children of parents from two different regions is lower than the average between the indices of these regions. —This law may be stated in accordance with our verification of it in the following form: *The dolichocephalic members of a community are more apt than the brachycephalic members to choose their spouses outside of the residents of their own birthplace.*

This curious law was discovered in comparing in the case of natives of Hérault, the index of subjects whose parents were born in the same canton, with the index of subjects whose parents were born in different cantons. The first class of subjects may be designated as *cantonaux* and the second class as *intercantonaux*. The following table shows for adult male subjects, in the case of the department as a whole and in the case of each of the arrondissements, the difference between the *cantonaux* and the *intercantonaux* in cephalic index and also in the absolute dimensions of the head:

Arrondissements	Cantonaux				Intercantonaux			
	Number of subjects	Length of head	Breadth of head	Index	Number of subjects	Length of head	Breadth of head	Index
		mm	mm					
Montpellier	448	186	152	82.1	35	187	151	81.1
Lodève	81	186	153	82.2	10	195	155	79.6
Béziers	148	188	150	79.9	14	187	146	78.4
St. Pons	99	189	152	80.6	11	193	147	76.2
Total for department	776	187	152	81.5	70	189	150	79.8

The results of this table are substantiated by a comparison of a small number of female subjects: nine *cantonaux* giving an index of 78.1 and two *intercantonaux* an index of 76.9. Further confirmation is found in a similar comparison of two groups of

children: twenty-three *cantonaux* giving an index of 84.7 and five *intercantonaux* an index of 81.5.

The difference in cephalic index between the *cantonaux* and the *intercantonaux* is about the same in Ille-et-Vilaine. A series of peasants of the relatively dolichocephalic region of Bécherel and Hédé formed the basis of a table in my *Sélections sociales*,[1] which was unfortunately inverted through a typographical error. The table should read as follows:

	Adult Males		Females		Children	
	Number of subjects	Index	Number of subjects	Index	Number of subjects	Index
Cantonaux	23	83.5	8	84.5	17	85.0
Intercantonaux[2].	12	82.5	6	83.3	5	84.1

In the department of Ille-et-Vilaine, as a whole, a series of twenty-five *cantonaux* gave an average index of 85.5; a series of twenty-five *intercontanaux* an average index of 83.0. The average head length of the *cantonaux* was $185^{mm}.0$; that of the *intercantonaux* 188. The average head breadth of the two groups was respectively 136 and 156.

The following table presents a comparison in several departments of France between subjects whose parents came from the same arrondissement and subjects whose parents came from different arrondissements:

Departments	Parents from the same arrondissement		Parents from different arrondissements	
	Number of subjects	Index	Number of subjects	Index
Pyrénées-Orientales.....	5	83.33	2	79.34
Aude	6	78.08	2	81.17
Aveyron	18	84.45	7	83.02
Lozère	7	88.35	4	85.15
Gard.....	22	82.77	2	81.10
	35	83.39	18	81.95

[1] P. 379.

[2] This group includes subjects whose parents came from different arrondissements as well as subjects whose parents came from different cantons.

In accordance with this law we should expect subjects whose parents were born in different departments to be more dolichocephalic than the average population of the two departments of origin. That such is the case is shown by the following table:

Departments of origin	Average index of the departments of origin	Interdepartmentaux	
		Number of subjects	Index
Ariège—Aude	81.9	2	76.6
Ariège—Hérault	82.7	1	81.8
Pyr. Or.—Aude	79.8	1	79.9
Aude—Hérault	81.8	2	81.0
Aude—Tarn	82.3	1	81.0
Tarn—Hérault	83.1	16	79.5
Aveyron—Hérault	84.0	18	79.6
Aveyron—Vaucluse	83.5	1	82.5
Lozère—Hérault	85.2	2	83.6
Lozère—Gard	85.5	3	83.9
Gard—Hérault	82.8	14	82.2
Ille-et-Vilaine—Morbihan	82.8	10	82.7
Ille-et-Vilaine—Côtes-du-Nord	83.6	23	82.2
Ille-et-Vilaine—Loire-Inférieure	83.7	7	82.8
Ille-et-Vilaine—Mayenne	83.9	6	82.6
Ille-et-Vilaine—Finistère	82.8	5	81.8
Finistère—Côtes-du-Nord	82.8	4	82.0

Ammon has obtained analogous results in the Grand Duchy of Baden, but further than this the extent to which this law is applicable is not yet determined.

LAW OF THE CONCENTRATION OF DOLICHOIDS.[1]

In the dissociation of the elements of population the migratory elements are attracted to the centers of dolichocephaly.—We have seen already: (1) that the migrants belong to the relatively dolichocephalic element, and (2) that the cities and the more fertile regions are populated by dolichoids. It might then be said that "the dolichoid attracts the dolichoid," but in reality that which attracts the second dolichoid is the same thing that attracted the first: it is the more intense desire, characteristic of *Homo Europæus*, for an active and influential career and for a cultivated

[1] The term dolichoid is used to designate all subjects with an index below 80.

life. Wherever there is an opportunity he seizes upon it, if, indeed, he has not himself created it; and there is never lack of a brachycephalic to step into the place vacated by the dolichocephalic.

The discovery of the law of concentration is to be credited to Ammon, and his name is associated especially with that form of the law which concerns the particular case of urban concentration: "In regions where the brachycephalic type prevails, it tends to become localized in the rural localities, while the dolichoid type becomes concentrated in the cities."

The following table is taken from Ammon's *Natürliche Auslese beim Menschen.*[3]

	Index	Average head length	Average head breadth
KARLSRUHE			
Average of Karlsruhe district	83.0	184mm	154mm
Immigrants from other parts of Baden	83.1	184	154
Immigrants from outside of Baden	82.5	186	154
Demi-urbans (=sons of immigrants)	81.5	186	153
True urbans (=sons of residents of Karlsruhe)	81.4	186	153
Subjects born in Karlsruhe of fathers from another city	80.2	184	149
Subjects born in another city of fathers from another city	81.8	185	152
Subjects born in another city of fathers from country	80.3	184	151
Subjects born in country of fathers from country	82.8	184	153
FREIBURG			
Average of the Freiburg district	83.6	182	153
Immigrants from other parts of Baden	83.0	184	154
Demi-urbans	82.0	185	152
True urbans	80.8	187	151

The difference in average index between the several categories results from the unequal proportion among them of dolichoid subjects. This is brought out in the following table:

	Average of Baden	Karlsruhe		
		Immigrants	Demi-urbans	Urbans
Per cent. of indices below 80	12.2	14.9	25.9	33.3
Per cent. of indices of 85 and above	38.2	33.3	18.4	12.4

[3] P. 91.

	Average of Baden	Freiburg		
		Immigrants	Demi-urbans	Urbans
Per cent. of indices below 80	12.2	12.4	22.5	43.7
Per cent. of indices of 85 and above.	38.2	32.3	27.7	14.8

This process of the concentration of the dolichoids tends in general to raise the average indexes of the various regions concerned, by abstracting from the brachycephalic regions the least brachycephalic elements and adding these to populations less brachycephalic still. As examples of this result the following data may be given:

EMIGRATION FROM THE DEPARTMENT OF AVEYRON.

Department	Number of migrants	Index	Department	Number of migrants	Index
Aude	1,294	82.0	Lot	1,927	85.9
Bouches-du-Rhône..	4,098	82.2	Lozère.....	1,178	87.8
Cantal.....	2,697	87.0	Rhône.....	1,043	86.0
Gard.....	2,228	83.1	Seine.....	26,736	81.5
Haute-Garonne.....	3,289	83.4	Tarn.....	4,607	83.7
Gironde.....	2,207	82.6	Tarn-et-Garonne ...	1,471	85.8
Hérault.....	18,191	82.5			

Born in Aveyron 456,068, of whom 376,162 are residents of the department and 81,906 have emigrated therefrom. Average index of Aveyron, 85.5.

EMIGRATION TO THE DEPARTMENT OF HÉRAULT.

Department	Number of migrants	Index	Department	Number of migrants	Index
Ardèche.....	2,011	85.2	Haute-Garonne.....	2,703	83.4
Ariège.....	4,517	82.9	Lozère.....	5,945	87.8
Aude.....	7,507	82.0	Pyrénées-Orientales.	3,768	78.2
Aveyron.....	18,191	85.5	Savoie	1,082	87.4
Bouches-du-Rhône..	1,587	82.2	Tarn.....	13,462	83.7
Cantal	1,093	87.0	Tarn-et-Garonne ...	1,628	85.8
Gard	5,468	83.1	Vaucluse	1,369	81.5

Resident population of Hérault, 447,029; of whom 353,740 are natives of the department, and 88,289 immigrants thereto. Average index of Hérault, 82.5.

LAW OF URBAN ELIMINATION.

Urban life acts as an agency of selection in favor of the dolichoids and destroys or rejects the most brachycephalic elements. — Of the migrants to the cities the greater part perish there without descendants or drift back again in what has been called "the return current of population." Thus among the conscripts of Karlsruhe, Ammon found the numbers of immigrants, of sons of immigrants, and of sons of urban born, respectively 615, 119, and 48; and among the conscripts of Freiburg, respectively 403, 80, and 48. As between the different ethnic types, the dolichoids succeed much better than the brachycephalics in establishing permanent families in the cities. Thus in Karlsruhe the percentage of indices below 85 increased from 66.6 among the immigrants, to 81.6 among the sons of immigrants, and to 87.6 among the sons of urban born; at Freiburg the percentage increased correspondingly from 68.7 to 72.3 and to 85.2. So too, on the other hand, the percentage of indices of 85 or above fell off at Karlsruhe from 83.3 among the immigrants to 18.4 among the sons of immigrants and to 12.4 among the sons of urban born, and correspondingly at Freiburg from 31.3 to 17.7 and to 14.8.

Urban life exercises a selective influence also in regard to color. It has been noticed that urban populations are not distinguished from the rural by lighter coloration to the degree that they are by dolichocephaly.

The tables on page 86 indicate the prevailing coloration among the several categories of Baden conscripts.

Several explanations, all of them plausible, have been suggested to account for this phenomenon. It has been alleged that the dark coloration of the urban populations is due to the concentration of the dolicho-brown or Mediterranean type along with the dolicho-blond; or again that it results from the pres-

COLOR OF THE EYES.

	Karlsruhe		Freiburg	
	Per cent. light	Per cent. dark	Per cent. light	Per cent. dark
Average of Baden	63.3	36.7	43.5	55.0
" " the district	56.6	43.4	23.5	66.2
Immigrants from the district	67.5	32.5	22.6	75.4
" " other parts of Baden	59.0	41.0	29.8	69.5
" " outside of Baden	67.7	32.3	....	....
Demi-urbans	55.5	44.5	31.3	67.5
Urbans proper	64.6	35.4	52.1	47.9

COLOR OF THE HAIR.

	Karlsruhe		Freiburg	
	Per cent. light	Per cent. dark	Per cent. light	Per cent. dark
Average of Baden	43.5	55.0	43.5	55.0
" " the district	31.7	67.4	23.5	66.2
Immigrants from the district	27.5	72.5	22.6	75.4
" " other parts of Baden,	30.8	68.2	29.8	69.5
" " outside of Baden	38.1	60.3	....	....
Demi-urbans	25.9	72.1	31.3	67.5
Urbans proper	37.5	62.4	27.1	66.7

ence of a large group of mixed ancestry with the head form of *Homo Europæus* but the coloration of *Homo Alpinus*. In my opinion it is necessary to take into account two further explanations of this phenomenon. The first is that life in the city appears to produce a redistribution of pigment tending to whiten the skin and to darken the hair and the iris. The second is that the vitality necessary to resist the influence of the abnormal and debilitating life of the city is more often possessed by the least blond members of the race *Europæus*. We must not for get that the blondness of this race is a form of degeneration. There is then among urbans of the race *Europæus* a reversion to the ancestral type, to the races of the end of the quarternary period and of the neolithic epoch. I have never examined a series of the skulls of urbans and especially of the superior

classes, without being struck with the numerous likenesses to prehistoric skulls. This atavism is, it may be remarked parenthetically, especially marked among the "Yankees."

LAWS OF STRATIFICATION.

The cephalic index is lower and the proportion of dolichocephalic greater among the higher classes than among the lower classes in each community.—This law appears applicable to regions inhabited by the brachycephalics and the Aryans, and perhaps also to those inhabited by the brachycephalics and the Mediterraneans.

Numerous local researches with reference to the correlation between race and social position have been made in France and Germany. The recent work of Chalumeau in Switzerland, although based directly on a comparison of stature, shows a singularly regular seriation from the bottom to the top of the social scale. In my *Sélections sociales* and in Ammon's *Natürliche Auselese beim Menschen* may be found some curious examples. I regret that I cannot now present some others more curious still which tend to prove a regular correspondence between the racial origin and the profession of the individuals concerned. These last data being as yet unpublished cannot be cited here. The following table taken from the anthropological statistics of Italy gives a comparison by provinces between the three categories of intellectual classes, manual workers, and peasants, in respect to height and cephalic index (see pages 88, 89).

In the north of Italy, where, as we have pointed out in another connection, the comparison is between *Homo Europæus* and *Homo Alpinus*, the proportion of dolichoids is greater among the higher than among the lower classes. In the south where the comparison is between *Homo Alpinus* and the Mediterranean race, the upper classes are often the more brachycephalic. It has been suggested that we ought to conclude from this that the Mediterranean is inferior to *Homo Alpinus*, as is the latter to *Homo Europæus*. My own opinion is that the phenomenon is simply the result of the domination of Piedmont. From other tables in the *Antropologia militare* it appears that the brachy-

cephalics of the south are descended from the old subjects of the House of Savoy, who moved into southern Italy. It is in any

Province	Per cent. of tall subjects (1.70 m. and above)			Per cent. of dolichoids (index below 80)		
	Intellectual classes	Manual workers	Peasants	Intellectual classes	Manual workers	Peasants
Allesandria	27.6	22.8	18.6	14.3	7.6	5.1
Cuneo	31.2	16.2	24.3	4.8	4.2	5.0
Novara	44.4	19.0	17.3	7.7	6.4	4.9
Torino	35.2	13.7	15.1	6.2	6.5	6.6
Genova	39.9	20.9	19.2	25.7	24.4	28.3
Porto Maurizio	14.3	22.2	4.0	14.3	30.6	36.0
Bergamo	52.9	20.5	19.6	....	11.3	7.5
Brescia	43.1	16.4	20.2	22.0	20.7	16.3
Como	52.4	21.0	22.4	9.5	8.9	7.0
Cremona	33.3	18.2	8.8	16.7	15.3	8.8
Mantova	33.3	19.7	7.5	23.5	15.7	9.4
Milano	42.5	19.6	17.0	14.1	10.6	8.8
Pavia	43.5	21.0	9.5	19.6	9.2	5.8
Sondrio	22.2	17.8	12.2	....	11.4	2.7
Belluno	68.8	8.1	26.2	6.2	4.2	4.8
Padova	44.3	23.5	34.9	9.8	9.9	3.9
Rovigo	25.0	21.1	15.7	8.3	9.4	10.8
Treviso	44.4	30.8	30.2	11.4	6.1	6.3
Udine	56.3	30.9	34.6	15.6	11.3	6.2
Venezia	42.2	21.7	28.9	12.4	13.5	12.6
Verona	49.1	27.7	29.5	25.5	23.7	20.8
Vicenza	37.9	28.1	28.3	13.8	9.0	3.8
Bologna	38.4	23.3	26.7	15.5	13.6	7.0
Ferrara	31.9	18.4	15.9	13.3	11.4	6.4
Forlì	50.0	20.4	17.0	12.5	3.8	5.6
Modena	30.6	23.5	29.0	22.5	13.2	13.0
Parma	30.5	16.2	10.6	6.8	18.3	17.4
Piacenza	28.3	23.3	12.3	19.2	14.6	9.1
Ravenna	50.0	22.4	21.1	....	4.8	2.5
Reggio Emilia	39.1	25.1	28.3	22.6	8.4	3.7
Arezzo	48.7	17.2	21.2	....	12.7	11.0
Firenze	46.3	26.5	25.1	33.3	34.0	27.3
Grosseto	25.0	25.0	25.0	25.0	....	....
Livorno	34.0	24.9	20.9	46.9	53.0	29.1
Lucca	59.0	37.2	41.9	59.0	68.1	69.2
Massa	41.7	20.4	21.3	41.7	61.1	63.6
Pisa	36.4	22.1	27.1	30.3	42.3	33.1
Siena	33.3	18.7	16.8	20.6	20.8	14.8
Ancona	35.2	24.6	12.8	28.3	30.9	13.0
Ascoli	21.4	13.3	11.3	14.3	35.6	31.8
Macerata	26.7	15.5	7.8	7.1	25.7	15.7
Pesaro	24.2	17.8	13.4	15.2	9.4	6.6
Perugia	37.0	20.9	9.4	22.2	11.5	6.9

Province	Per cent. of tall subjects (1.70 m. and above)			Per cent. of dolichoids (index below 80)		
	Intellectual classes	Manual workers	Peasants	Intellectual classes	Manual workers	Peasants
Roma	39.3	20.6	14.8	41.2	52.5	42.5
Aquila	34.8	25.2	13.3	17.4	23.8	29.5
Campobasso	38.5	6.6	2.5	15.4	38.9	37.2
Chieti	35.0	12.6	7.3	5.3	19.4	16.7
Teramo	17.4	13.4	6.2	23.8	39.1	33.1
Avellino	31.0	10.2	9.6	28.6	20.4	28.6
Benevento	21.4	10.6	7.8	28.6	34.2	36.5
Caserta	13.6	12.3	11.4	18.2	33.5	40.6
Napoli	28.5	14.5	16.0	24.0	19.0	22.0
Salerno	25.0	9.9	6.4	10.7	13.6	8.2
Bari	26.8	13.3	13.9	24.4	24.5	34.2
Foggia	31.2	15.9	12.5	31.3	42.6	38.2
Lecce	42.3	14.6	12.5	59.6	76.2	74.3
Potenza	26.1	7.2	1.1	17.4	25.3	18.7
Catanzaro	20.8	12.5	3.6	60.9	60.2	57.4
Cosenza	21.4	12.4	12.1	64.3	67.0	78.1
Reggio Calabria	27.0	17.4	8.8	18.9	46.9	50.0
Caltanisseta	38.1	8.5	5.2	45.0	52.7	65.3
Catania	23.7	14.5	18.4	37.2	41.6	34.1
Girgenti	31.4	15.6	6.1	18.2	46.9	46.3
Messina	24.6	17.4	13.8	45.3	47.1	50.8
Palermo	26.7	21.7	16.1	45.6	56.0	54.5
Siracusa	25.8	12.0	14.1	34.5	32.0	37.2
Trapani	37.5	23.1	16.4	37.5	40.4	44.5
Cagliari	21.4	7.1	9.8	42.9	42.9	55.9
Sassari	11.6	10.7	4.1	55.8	65.6	75.0

case uncertain in just what form the law of stratification will be found to apply in countries where the Mediterranean element enters largely into the population.

It is notable that even in southern Italy the stature of the subjects is in close parallelism with their social position. Further, an analysis of the data indicates that the superior height of the upper classes is not due alone to the predominance of individuals of Piedmontese origin. This parallelism between social position and stature is indeed much more universal than that between social position and cephalic index. Chalumeau in his *Influence de la taille humaine sur la formation des classes sociales* has shown the closeness of the correlation: individuals of tall stature (over 1.70) constitute over 30 per cent. of physicians,

ecclesiastics, students, advocates, veterinary surgeons, architects, engineers, pharmacists, brewers, teachers, merchants; running from 47 per cent. among physicians to 31 per cent. among merchants, and from 11 to 7 per cent. among various categories of artisans and operatives. Verneau in criticising another work of Chalumeau, has expressed a doubt as to the truth of the law that the more intellectual classes contain the larger proportion of individuals of tall stature. The answer is to be found in the work of Chalumeau above cited for Switzerland, in Livi's statistics for Italy, in those of Beddoe and of Quételet for England and for Belgium. In all these countries and in all others in which similar statistics have been compiled, the correlation between height and social position has been verified. By way of a last example, I cite here the results of Oloriz in Spain:

	Stature	Cephalic index
Intellectual classes,	1.62 m	78.2 m
Intermediate,	1.61	77.9
Manual laborers,	1.60	77.8

LAW OF THE INTELLECTUAL CLASSES.

Among intellectual workers the absolute dimensions of the head, and particularly the breadth, are greater than the average.—This law was long ago formulated by Durand de Gros, who working at Rodez found the length and breadth of the head among the educated respectively 187mm and 155mm; among the uneducated respectively 180 and 151. It has since been verified in many countries by the comparison of students with the average population. The greater size of the head among the intellectual classes is not due to an expansion of the brain by its training and activity; the difference is, according to my own researches, quite as marked between young children of the intellectual classes as between the adult members of the same groups.

Social status is then in correlation with the dimensions of the head as with the stature. Meager statistics under this head have as yet been published, but manuscript data in my possession

point to the following order of the professions: students of science, of letters, of agriculture; students of law, merchants and public administrative employees, artisans, factory workers, day laborers, and peasants. I have intentionally separated students of law from the other students; as there is an appreciable difference between them in the dimensions of the head. This difference becomes marked when one compares a group of professors of science or of literature, the élite of their category, with a group of magistrates, recruited for the most part among the graduates in law incapable of finding an independent position.

This law of the intellectual classes tends to come into seeming conflict with the law designated above as the law of stratification. The intellectual worker tends to possess an exceptional breadth of head more marked than the exceptional length. He is likely then to be less dolichocephalic than the average of his social compeers, he is likely to possess a degree of eurycephaly which may be easily confused with brachycephaly. This aspect of the matter has been considered by Ammon in his anthropological study of Prince Bismarck, by Collignon in his researches on the Basques, and by Ujfalvy in his recent work, *Les Aryens au Nord et au Sud du Pamir*.

It follows from this that in a region where the brachycephalic race is not present in an appreciable degree, the upper classes may present an average cephalic index higher than the mass of the population. This occurs, for example, in Spain, where the average index of the intellectual classes is 78.2, as against 77.8 for the manual laborers. It occurs also in the British Islands, where the index of educated Englishmen is 78.5, as against 77.8 for the average population of Great Britain. In the south of Italy the same phenomenon co-operates with the invasion of Piedmontese, already discussed, to raise the index of the intellectual classes.

LAW OF EPOCHS.

Since prehistoric times the cephalic index has everywhere and constantly tended to increase.—The length of the head has tended,

and still tends, to decrease and the breadth in general to increase. This is one of the first established laws of social anthropology, and it is unnecessary to enlarge upon it here.[1]

The laws enumerated above are obviously closely connected and tend to merge one into another. It appears that they may properly be regarded as the detailed and partial statements of various phases of one general law, formulated by Closson and designated by him as the Law of Lapouge, viz., *the law of the greater activity of Homo Europæus.* The particular laws that we have examined are, indeed, only a few among a multitude of similar generalizations, some of which are established, others of which have been vaguely perceived in the course of studies undertaken in the verification of the former, and which will require prolonged special researches before their significance can be fully understood. We are as yet only on the threshold of the discoveries which will result from a thorough ethnical analysis of the populations of the civilized world, particularly of Europe, and from a study of the data thus obtained in the light of the methods of anthropo-sociology.

GEORGES VACHER DE LAPOUGE.

RENNES, FRANCE.

[1] Cf. *Les Sélections Sociales*, pp. 34, 382, 412–420.

NOTES.

THE sudden and dramatic death of Henry George on the eve of the mayoralty election in New York, in which he struck fire by his characteristic and passionate denunciation of "boss" rule, brings to a close a remarkable economic career. An unknown compositor, without wealth, by virtue of a taking style, a brilliant imagination, and persistent earnestness in one special field, made his name known not merely to his own country, but to the whole world, as a household word. He caught the unrest of the time and gave it an economic justification, which, whether correct or not, made a conquest of great numbers of men. By giving, in an illuminating way, a specific cause of poverty, he satisfied many minds not capable of reasoning out difficult economic problems. Whether or not his conclusions were based upon sufficiently sound processes may be left to a more careful study of the period in which he lived, and of the quality of his contributions to political economy.

THE MONETARY COMMISSION.

THE refusal of Congress to accept the recommendation of President McKinley concerning the appointment of a suitable Monetary Commission owing to the preponderance of free silver influences in the Senate, has led to a result which, although perhaps unlooked for, was only the outcome of the existing situation. It is a commonplace to say that it is an American characteristic that the people initiate measures which in other countries are left wholly to the government, or to those in positions of public authority. The appointment of the Monetary Commission by the executive committee of the Indianapolis Monetary Convention is a striking example of this American tendency. It scarcely needs to be recalled that the Indianapolis Convention at its meeting of last winter decided to arrange for the appointment of a Commission of competent men which should fully represent the business interests of the country, in case Congress should fail to provide for the investigation of the monetary question. As most of the readers

of this JOURNAL probably know, this Commission was duly appointed[1] and began its sessions in the latter part of September. Soon after the December number is in the hands of its readers a preliminary report will probably be rendered.

There can be little doubt as to what the main features of this report must be. The present condition of the currency is familiar, and the ultimate remedies to be applied cannot for a moment be subject to a doubt in the mind of any unprejudiced thinker, no matter what his ideas upon purely theoretical questions may be. The details of the mechanism by which these remedies shall be applied are, however, less certain. But these are only details and can be safely left to the judgment of a body of experienced and unprejudiced men. It is, therefore, beyond question that the report will meet the views of all those who wish to continue the prosecution of trade and industry, without a jar, upon its present lines. The retirement of the greenbacks by some mechanism or other, is, it goes without saying, a fundamental necessity and should be recognized as such by the Commission. Some means of dealing with the silver dollar, of arranging for its redemption in gold, or at least recognizing the necessity of such redemption, must also be provided. The third strand in the report of the Commission must necessarily be some provisions for the establishment of a system of banking, which shall permit both elasticity in the issue of notes and in the distribution of banking facilities, whether this latter be by the establishment of branches or of small banks, or both. There is probably no student of monetary affairs who does not recognize that the demand for change in the monetary system points to the existence of real needs. In the crude popular mind, misled by demagogical agitators, a genuine economic need has been translated into terms of insufficient currency, and if not met by proper remedies may result in serious danger to the whole fabric of credit and commerce. What this need is cannot for a moment be in doubt. The inflexibility of the present system of banking, the impossibility of now regulating credit-currency in accordance with commercial demands, the lack of adequate banking facilities and of proper distribution of those facilities have

[1] Consisting of the following members: George F. Edmunds, Vermont (chairman); George E. Leighton, Missouri (vice chairman); T. G. Bush, Alabama; W. B. Dean, Minnesota; Charles S. Fairchild, New York; Stuyvesant Fish, New York; J. W. Fries, North Carolina; Louis A. Garnett, California; J. Laurence Laughlin, Illinois; C. Stuart Patterson, Pennsylvania; Robert S. Taylor, Indiana. L. Carroll Root and H. Parker Willis, Assistants to the Commission. Jules Guthridge, General Secretary.

undoubtedly resulted in a contraction, not of currency, but of credit opportunities in the South and West, which have seriously retarded and hampered the development of those regions. It is to meet needs so genuine and widespread that the Monetary Commission will recommend a plan for currency and banking reform.

Whatever the outlook for the adoption of any plan of currency reform by the present Congress may be, it will probably have nothing to do with the report of the Commission. The latter will merely aim to formulate a plan upon which all can unite, thus overcoming the weakness which results from a disunited application of forces which are essentially united upon questions of principle. In its methods, the Commission has proceeded, so far as known, with the utmost impartiality and scientific care. It has asked for and received an immense number of expressions of opinion, both general and in reply to specific questions, and it has carefully considered the mass of information thus accumulated. Every point has been discussed most anxiously. Whatever the precise recommendations may be, it cannot be doubted that they will represent the best current thought on the questions upon which they bear.

It remains in the hands of the public to determine what shall be the outcome of the labors of the Commission. H. P. W.

GOLD, LABOR, AND COMMODITIES AS STANDARDS OF VALUE.

In the campaign of a year ago two opposing views were urged regarding the fluctuations of our monetary standard. One party maintained that since the price of commodities has declined, gold must have appreciated in value, a certain quantity of it exchanging for a constantly increasing quantity of commodities; another class held that since wages have constantly advanced, gold has in fact depreciated, a given amount of it exchanging for a constantly lessening quantity of labor.

One is impressed with the fact that the premises in both cases are true, and if true why are not the deductions satisfactory? Commodities have fallen in value, and wages have advanced, but it is plain that gold cannot have appreciated and depreciated at the same time. Is there any way by which its appreciation relatively to commodities and its depreciation relatively to labor can be reconciled?

By the older economists two very different standards of deferred payments were advanced; the labor standard of Ricardo and Adam Smith, which required the debtor to return to his creditor the equivalent of his debt in labor; and the commodity standard of J. S. Mill, which required the debtor to return the equivalent of his debt in commodities. It is certain that the difference is a fundamental one. If we accept the labor standard, the advantage in deferred payments lies wholly with the creditor. Any improvements in production will make labor more effective, while the debtor must return the same number of days' labor as received. On the other hand, if we accept the commodity standard, the advantage lies with the debtor, any improvements in production making it possible for him to return an equivalent of the commodities borrowed with less effort on his part.

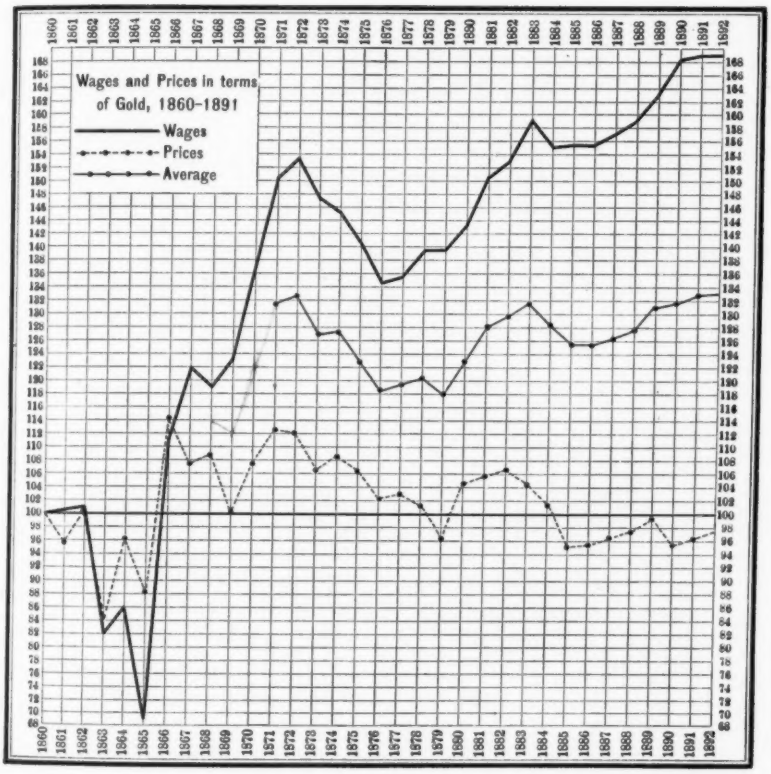
It would seem, then, that neither of these standards is just to both parties if taken by itself; and if we are to regard the rights of debtor and creditor alike, both standards must be considered, and it would appear reasonable to consider them of equal importance.

What effects may be expected to follow from the use of improved machinery and methods of production? First, there will naturally be a large output per unit of capital and labor expended, and hence a reduction in value per unit of product. Second, labor will become more effective, and hence, other things being equal, wages will rise. If the rise in wages corresponds to the fall in prices, the entire effect may be expected to have resulted from the improvements in production; but if the rate of fall in prices and rise in wages is very different, or if both rise, or both fall, it is safe to assume that there has been a fluctuation in the standard of value.

Bearing in mind these things, it would appear that we may have a logical basis for determining whether our monetary standard has actually appreciated—a basis from which some conclusion can be reached. If it shall appear upon investigation that the rate of rise in wages and fall in prices has closely corresponded, there certainly need be no alarm as to any great appreciation of our standard of value.

The Aldrich Report, presented to the United States Senate in 1892, furnishes us with the necessary data from which the movement of prices and wages from 1860 to 1891 can be ascertained and compared.

The accompanying chart is intended to serve the purpose of such comparison. It is compiled from the prices and wages given in the


Wages and Prices in terms of Gold, 1860–1891
Wages
Prices
Average

above-mentioned report, reduced to a gold basis. The prices are wholesale, taken from 223 commodities, and the wages are gathered from 543 occupations, both prices and wages being averaged according to importance. The prices and wages of 1860 are taken as a basis of 100, the heavy line representing the movement of wages and the broken line the movement of prices. The light line of the chart is simply the mean between the other two.

It will be noticed that during the paper inflation of 1865 gold wages reached the lowest point, 31.3 per cent. below 1860. From this there was a rapid rise to 53.2 per cent. above the base line in 1872, followed by a fall to 34.2 per cent. in 1876, after which we have a steady rise to 68.6 per cent. above in 1891. Prices reached the lowest point in 1863, 15.9 per cent. below 1860; the highest point in 1866, 14.3 per cent. above 1860, from that on falling gradually to 3.8 per cent. below the base line in 1891. If we average prices and wages regardless of importance, we find that from 1860 to 1891 wages advanced 60.7 per cent. above, and prices fell 7.8 per cent. below the base line.

But now let us take 1870 as a base, since it is claimed that from that time the great fall in prices is to be observed. From 1870 to 1891 prices fell 10.5 per cent., and wages advanced 21.8 per cent. From 1880 to 1891 prices fell 7 per cent., while wages advanced 18 per cent.

To illustrate the average of wages and prices the light line is drawn in the chart from 1871 to 1891. This line reaches its lowest point in 1879, but from this time on gradually rises to 32.4 per cent. above the base line in 1891, making a gain of 9 to 10 per cent. over 1871.

From the figures given we can now draw certain conclusions. Giving equal importance to wages and prices, it appears that from 1860 to 1891 gold has actually depreciated, a given quantity of it exchanging for less in 1891 than in 1860. From 1872 to 1876 there was a slight appreciation, both wages and prices falling, this in turn being followed by another depreciation, making our standard of value from 1871 to 1891 practically uniform.

It seems certain that the universal fall in prices has been due to causes of a very wide-reaching character. The hypothesis that our monetary standard has greatly appreciated cannot be accepted for the reasons given, and we are driven to the only alternative — that improvements in production have brought about the changes in wages and

prices. Especially does this hypothesis commend itself when we consider that the relative divergence in wages and prices is found to be almost exactly such as might be expected to result from the operation of this cause.

ARTHUR M. HYDE.
OBERLIN, OHIO.

AN EXERCISE IN EXPENDITURE.

THE following question was given to a class in economics: How would you spend ten thousand dollars? Tabulate the items. The object was to secure some definite idea as to the students' views of wealth consumption.

The class was composed of thirty-six persons eleven of whom were women. Their average age was about twenty-one years. The university of which this class is a part is located in a city of two hundred thousand inhabitants, and has twenty-six hundred students altogether. Of these probably one-third are from the city. Perhaps 60 per cent. are Americans, the remainder being largely of German and Scandinavian stock. Most of the students are in moderate circumstances. To all of the class ten thousand dollars was a considerable sum.

The items of expenditure were fourteen. The order in which they ran, on the basis of preference, was as follows: Education (24), real estate (17), travel (12), mortgages (10), bank stock, business, books, pleasure, each (7), charity (6), railroad bonds (5) mining stock, insurance, clothing, each (4), government bonds (3) and options (1). The item "charity" includes all gifts; "books" includes pictures and statuary. The aggregate expenditure distributed is $360,000. The accompanying table (page 99) shows the proportion devoted to each item.

The result is interesting in several particulars. In ten cases nearly the entire amount was invested in land, railroad securities, or government bonds. On the other hand, the small amounts assigned to pleasure, books, and clothing are very noticeable. The reason for this rather unexpected self-denial is possibly to be found in the economy taught by saving parents. Their ingrained frugality did not permit such an expenditure even upon paper. The proportion assigned to books may also seem surprisingly small. Only 1.6 per cent. is set aside for this purpose by eight persons. This is partly to be explained by the presence of public libraries and reading rooms.

Education and travel are given some attention by twenty-four of the

Number	Sex	Education	Travel	Real Estate	Mortgages	Railroad Bonds	Governm't Bonds	Bank Stock	Business	Mining	Charity	Books	Pleasure	Insurance	Options	Clothing	Use of Income
1	w	1,500	1,000	5,000				2,500		7,000	1,000						
2	m	2,000															
3	m	2,000		8,000													Education
4	w			10,000													Education
5	m				1,000												
6	m							10,000									
7	m	500					9,500										
8	m	1,000	500				8,500										
9	m			10,000													
10	m	500				9,500											Education
11	m	500		2,000	5,500			1,500							500		
12	m					9,900							100				
13	m	500							10,000	500							
14	m	1,000			8,500					2,000							
15	m	500															
16	w	1,000	1,500			7,500						1,500					
17	m	1,500		3,000			7,500		3,000								
18	m	500						9,500									
19	w			2,500	2,000			5,000			2,500	500	200	300		100	
20	m	800	600														
21	w	1,000		9,000	2,800				1,000			2,000					
22	m			7,200	5,000				5,000								
23	w	1,000	1,000						4,500		500		50	200			
24	m			5,000					7,200		550	300					
25	m	1,000		3,500													
26	m	1,400	300														
27	m				1,000	1,000		3,000			5,000		500	100			Education
28	w	400															
29	w			5,000	5,000				1,650		1,000	425	150			75	
30	m	3,000	1,500	5,000				5,000			1,000						
31	m		1,150	5,550													
32	w	2,000	2,000			4,000						150	150	500		100	
33	w	1,000	500	4,300													
34	w	700	700	3,000	5,000					4,500							
35	m	1,000		7,500	4,500							500	450		500	50	
36	m		1,000														
360,000		25,700	14,200	106,050	58,300	30,900	25,500	36,500	22,350	13,000	11,050	5,875	1,600	1,100	500	325	

number. Eight women devoted $15,300 to these items; their estimates for such expenditure are more liberal than those of the men.

Of the eight who contribute 3 per cent. of the total amount to charity only two are women. Thus, while they make up 30 per cent. of the class, they constitute only 25 per cent. of those who would use a part of their money for others. There is at the same time a noticeable tendency on the part of the women to give their expenditure a personal character. The items of travel and education corroborate this to some degree.

As will be seen by the table real estate seems to be the favorite investment; mortgages are the second choice; bank stock and business, railroad and government bonds follow in this order. The large expenditures for mortgages and real estate are explained in part by the fact that many of the fortunes of the Northwest have been accumulated by this means. Railroad bonds have received less attention, probably in part because many of the railroads in the Northwest have failed to meet their obligations. There is also a prejudice against railroad companies in this part of the country. Government bonds are not attractive because of the premium and the low rate of interest.

The question was put to the class at the beginning of the Klondike excitement, but little effect of the gold fever was visible. Only one of the four who propose expenditure in mining expected to use the money in a Klondike scheme. The other three were mining engineers who would naturally desire to put part of their money into their own business. Among the thirty-six one only indicates a desire to speculate in in options.

FRANK L. MCVEY.

UNIVERSITY OF MINNESOTA.

SOME ODDITIES OF STATISTICAL METHOD.

IN the *Chicago Chronicle* of September 3, 1897, we find the following credited to the Utica *Observer*:

> Mulhall, the famous statistician, puts the value of the average product per head in England at $513.60; France, $634.40; Germany, $379.20; Austria, $350.40; America, $2,204. Any comparison of wages which leaves out the value of the product of labor is a manifest absurdity. The American manufacturer is not at the disadvantage of the English manufacturer, as to labor, unless the American pays his labor four and one-half times as much per day as the Englishman. The reason is plain. The average American

product per head is $2204, while the average English product per head is less than one-fourth that or $513.60.

As far as this relates to the United States, it is probably not an overstatement to call it absurd. Mr. Mulhall has obtained his product per operative in the United States by dividing the sum of manufactured products, without any deduction for material consumed by the average number of operatives employed.

Absurd, however, as this is, we find in the January 1896 Bulletin of the Department of Labor, an article by an official of the Census Bureau, on "The wealth and receipts and expenditures of the United States Government" in which not only are incomparable census estimates of valuation compared, but the sum of manufactured products are aggregated with farm, fisheries and mineral products, and the sum total stated as the value of the products of industry, and this without any explanation that the products of farms, mines, and fisheries have been largely consumed in manufactures, together with a large proportion of the manufactured product in creating other products. What wonder that with such statistics presented to our working people there should exist a widespread conviction that the value of the products of industry is far greater than is the truth.

In a socialistic journal we find copied from an English socialistic journal, the *Clarion*, the statement that the American laborer receives as wages but 17 per cent. of the value which his labor creates. This the writer recently heard quoted by a socialistic speaker, who, when his attention was called to his error, maintained that the figures were official. In this he was substantially correct, for the Tenth Census states the wages in $100 of products as $17.65.

In his *History of Prices* Mulhall makes substantially the same statement, saying, "Wages in Europe average 30 per cent. and in the United States 18 per cent. of the value of the manufactured goods."

These statistics, indicating that labor receives but an insignificant proportion of the value of the product of industry, are doubtless of the sort classed by Commissioner of Education, W. T. Harris, as hysterical, yet they are hardly more so than those presented by the Commissioner of Education, as showing that wage-earners receive practically all that is produced. In his recent article in the *Forum*, he presents tables intended to show the amount of product per day per inhabitant of the various states and of the United States and a comparative table

of the product in the United States for the years 1850, 1880, and 1890 and remarks:

I consider the most important item of economic statistics to be that which shows the total product of the state or nation in the form of the average per day for each inhabitant. This item helps the individual citizen to compare his daily wages or his annual income with the quota which he would receive in case the total product of his state or nation were distributed to each inhabitant without any deduction for capital, for land, or for supervision. A continual view of this ratio is most healthful for all members of the community. Any person socialistically inclined, will ask himself, What does my whole state (Massachusetts for example), or my nation (the United States, or Russia, or France), produce per day per inhabitant? Taking the wage-earners as about one-third of the population, let each one multiply the average quota per inhabitant for the United States by 3 and compare it with the wages he himself is receiving. The result is astonishing to most persons who take pains to get an accurate inventory of the production of the nation.

According to the last census, the total value of farm products, including live stock, amounted to $.108 per inhabitant (per day), for the whole United States, the manufacturing products to $.184, the mining products to $.0254, making a total in these three great items for each individual of $.3174 (not quite 32 cents) per day, or $2.2218 per week, or $9.522 per calendar month. Multiplying by 3 to obtain the representation of the average wage-earner, we find that he stands, for $6.6654 per week, or $28.566 per month. The particulars for the several states are given in the following table.

This table occupying much space and omitting important items afterward considered, need not be presented. Commissioner Harris further remarks:

These estimates take the farm products at the farm and the manufactured products at the mill; but there is an immense industry on the part of the people, namely, that of transportation, which adds to the value of the total product by the time it gets to the hands of the consumer. This item for transportation amounts to $1,076,940,357 per annum, or $.047 per day for each person. Besides this, in the agricultural estimate above, there has been no account made of the small gardening and other home agriculture, nor of the home manufactures which relate to the final processes of preparation of food, and especially to the making of clothing — items not reported in the census. The former item, which will include the product of household gardens and small farms, may be estimated at four cents a day for each inhabitant, or $14.60 a year. The estimate makes the amount of agricultural productions not reported 37 per cent. of the amount reported in the United States census — an amount apparently too large. The household manu-

factures which do not get reported in the census (including cookery, sewing, etc.) are also counted at four cents per day, or $14.60 a year.

Besides these items there is a large contribution to the wealth of the country in the way of use or rental of houses and furniture already existing. Agricultural tools and machinery have been accounted for in the agricultural product. As regards houses and furniture: Allow for the rental of houses and furniture four cents per day, for railroad building $.013, and for miscellaneous $.015. I bring together these items in the following table:

For the United States	Value of 1889	Per inhabitant per day
Value farm products	$2,460,107,454	$.108
Value manufactured products	4,210,393,207	.184
Value mineral products	580,012,600	.0254
Value products fisheries	44,277,514	.002
Freight earnings (land)	734,525,726	.032
Drayage, etc. (estimated) 18 per cent. freight earnings	157,414,631	.007
Freight earnings (water) estimated	140,000,000	.006
Expressage (estimated)	45,000,000	.002
House rent (estimated)	680,000,000	.030
Furniture rent (estimated)	228,571,212	.010
Railroad building (estimated)	300,000,000	.013
Household manufactures not reported (estimated)	914,284,848	.04
Agricultures not reported (estimated)	914,284,848	.04
Miscellaneous (partly estimated)	342,856,818	.015
Total	$11,751,728,858	$.5144

The total sum is $.5144 for each person,— or $1.5432 for each wage-earner per day, or $10.80 per week. Any person, therefore, receiving eleven dollars a week, receives more than the quota that a wage-earner would receive (representing three persons), provided nothing were paid for interest on capital, for the use of land, or for directive power. It is interesting to compare with this the estimate which Mr. Mulhall makes in his recent book, *The Industries and Wealth of Nations* (1896). Comparing the same with the production per day of each inhabitant of Europe the figures are:

	Europe	United States
Farms	$.057	$.0955
Manufactures	.0774	.23
Commerce and transportation	.0586	.1250
House rent and furniture	.02	.05
Personal service and miscellaneous	.052	.102
Total	$.2650	$.6025

Besides the above tables Mr. Harris presents the following, and remarks: "The increase in aggregate earnings is encouraging, and still more so is the evidence of its distribution among all classes of people."

	1850	1880	1890
Agriculture (including live stock)	12.	14.5	10.8
Manufactures as reported	5.8	10.8	18.4
From transportation in enhanced value of products	1.2	3.7	4.7
Agricultural product consumed in the household and not reported	3.2	4.1	4.
Household manufactures not reported	4.8	4.4	4.
Building of railroads	.75	1.8	1.3
Mining, fisheries, and miscellaneous	.25	2.2	4.24
House and furniture rent	2.	3.	4.
Total cents per day for each person	30.	44.5	51.44

It would seem that what he deems the astonishing result of his inventory should have led Commissioner Harris to have doubted its accuracy, or to a very different conclusion. Having chosen statistics as the weapon with which to defend our present social system, he should have informed himself sufficiently regarding our national statistics to know that the value of the property of the United States in 1890 is placed at over 65 billions of dollars. Knowing this and the current rates of interest he should have been able to calculate in a rough way the income necessary to such a capitalization. Adding to this the profits of those who conduct the various enterprises, which he admits have been enormous, and deducting the sum from the total value of production it seems evident that the income of the average wage-earner (operative) is but little more than one half of $10.80 per week.

As this may seem surprising, not only to Commissioner Harris, but to very many who have been misled by misleading wage statistics continually quoted by those accepted as authorities, let us inquire more closely as to the earnings of labor and also as to the profits of what is commonly termed capital, whether as actual investment or as representing the value of special privilege. But first we shall inquire as to the increased production shown in the table presented by Commissioner Harris, in order to discover whether this apparent increase is not largely fictitious. In one of Colonel Wright's official communications we find the statement, "The enumeration of establishments in

certain lines of industry was more thorough at the Eleventh than at the Tenth Census." This evidently relates to the hand trades, regarding which it is remarked in the Eleventh Census: "No previous census of the United States obtained so complete reports regarding such trades as masonry, carpentering, blacksmithing, cooperage, painting, plumbing, and similar trades using machinery to a limited extent." The extent of this increase will be understood when it is stated that the manufacturing statistics indicate an increase, from 1880 to 1890, of 267 per cent. in the number of those employed in five of the building trades, though the tables of occupation show an increase of but 68 per cent. in the number of those reporting themselves as engaged in those trades The census report goes on to say:

> Previous census inquiries omitted the following industries: bottling; cars and general shop construction and repairs by steam railroad companies; china decorating; clothing, women's dress making; coffins and burial cases. trimming and finishing; cotton, cleaning and rehandling; cotton ginning; cotton waste; drug grinding; druggists' preparations, not including prescriptions; gas, illuminating and heating; hay and straw, baling; millinery, custom work; petroleum refining (petroleum refining formed part of a separate report at the census of 1880, and the statistics were not included in the report on manufactures). The inclusion of these industries in the Eleventh Census, together with the changes referred to, renders it impracticable to use the data for 1880 as a basis for comparison without carefully taking these facts into consideration.

Yet Commissioner Harris has not thought it worth while to take these facts into consideration, nor the fact that the figures of the census of 1890 are still more incomparable with those of earlier censuses. This incompleteness of the earlier censuses was but the inevitable result of the crude methods of enumeration. While in the last census and to a large extent the census of 1880, save in the country districts, the manufacturing census has been made by special agents who have been furnished ample facilities for a complete enumeration, in the earlier censuses the manufacturing census was incidental to the enumeration of population, and was taken by the assistant marshals who made the enumeration of population and who received for the enumeration of each manufacturing establishment but fifteen cents.

The results of this method is shown by General Walker in the following remarks at the Ninth Census:

> The experience of the census in 1860 and 1870 with the production of

four common and important mechanical trades, will give an idea of the scope of omission resulting from this course. A comparison of the tables of manufacture, with those of occupation for 1860, exhibits the fact that of 51,695 painters the production of only 913 is accounted for among the products of industry; of 242,958 carpenters only 9006 appear in the tables of manufactures; of 112,357 blacksmiths only 15,720, and of 43,624 coopers only 13,750; . . . . out of 450,634 artisans of the most efficient and best paid classes only 39,384 or 9 per cent. are accounted for in the statistics of manufactures. Had the 411,245 artisans not returned produced as much man for man as those who were embraced in the table of production, the gross products of industry would by the full representation of these four trades alone have been increased $475,755,951 or a little over 25 per cent. of what was actually reported, while the net products, deducting, that is, cost of materials consumed, would have been increased in a still higher ratio, namely, by $284,229,445 upon a total of $854,256,384, or as nearly as possible 33⅓ per cent.

The important industry of slaughtering and packing was not included in the manufacturing census of 1860. This industry was then to a larger extent conducted on the farm, as were such other industries as butter and cheese making, which are at present largely conducted in manufacturing establishments and included in the manufacturing census. There was besides a very considerable household production not included in the census returns in the manufacture of clothing and even in spinning and weaving. From the remarks of General Walker, showing the deficiency of the Ninth Census and the still greater deficiency of the census of 1860, it may be inferred that at that census not two-thirds of the actual production was reported. A like deficiency undoubtedly existed in the manufacturing statistics of 1850, the year chosen for comparison by Commissioner Harris.

A comparison with that year is, however, not admissible as showing the results of our present economic policy for the decade 1850 to 1860 was one of the freest competition in our history and precisely the opposite of our present policy. The marvelous development of this period is shown in the following table (page 107) compiled from the census and other official data.

The census figures for 1850 and 1860 seem fairly comparable because at each census precisely the same methods of enumeration were followed.

As reported in the census of 1860, the manufactured product amounted to 8 cents per day per inhabitant. Estimating the actual

	1850	1860
Cash value of farms	$3,271,575,426	$6,645,045,007
Value of farming implements and machinery	151,587,638	247,127,496
Manufacturing capital	553,245,351	1,009,855,715
Sum of manufactured products	1,019,106,616	1,885,861,676
Tonnage of merchant marine	3,525,454	5,325,454
Tonnage of American vessels engaged in foreign trade	1,439,694	2,379,396
Exports of gold and silver and domestic merchandise	136,946,912	373,189,274
Imports of gold and silver and domestic merchandise	178,138,318	362,166,254
Miles of railroad	8,588	30,598
Value of railroads (cost)	296,260,128	1,134,452,909
Number of banks	872	1,562
Banking capital	227,469,074	421,880,095
Loans and discounts	412,607,653	691,945,580

According to the figure of the census of 1890 the value of farms and improvements amounted to $10,197,096,776 in 1880, and $13,279,252,649 in 1890. The increase in value of farms from 1850 to 1860 was thus considerably greater than from 1880 to 1890, and almost as great as in the twenty years, 1860 to 1880.

production to have been 50 per cent. greater than reported, the value per day per inhabitant comes to 12 cents.

Thus comparing 1860 with 1890, there is an actual increase of some 50 per cent. in manufactured product, which appears to have been offset by a nearly corresponding decrease in the value of agricultural products. We are unable to quote the value of the agricultural products for either 1850 or 1860, because no estimate was made and the quantity of only the most important products are given, and this without the value. The figures of agricultural production for 1850 presented by Mr. Harris are, therefore, only a guess and not as they appear census estimates.[1]

It may be noticed that his figures show a marked decrease in the value of the agricultural product per inhabitant from 1880 to 1890. Were correct estimates obtainable they would doubtless show a greater decrease from 1860. The effect of our present economic policy on agriculture, our most important industry, employing more than 40 per cent. of our people, is best indicated by the decline of agricultural and rise of other values.

[1] Regarding such estimates Supt. Walker remarked, at the Ninth Census, "No estimate of the agricultural production of the United States is known to the Superintendent which is entitled to much more than the credit of good intentions."

Dividing the value produced in manufacturing industry, $4,210,393,207, by the number reported as the average number of employees, 4,712,612, and we have $893.43 as the average value produced by each operative. Dividing the value of the agricultural product, $2,460,107,454, by the number reported in the tables of occupation as engaged in this industry 8,565,926, and we have as the average value of the product per worker, $286.02. The value of the agricultural investment, land, improvements, live stock, and implements is reported at $15,982,267,689, computing interest on this valuation at but 5 per cent., and allowing 10 per cent. for renewal and repair of machinery and implements, and deducting this amount from the product, we have remaining $1,611,569,324 as the earnings of 8,565,926 agricultural workers, making the average earnings $188.

Commissioner Harris has included in his table an estimate of "Agricultures not reported amounting to 37 per cent. of the amount reported in the census," which he remarks is "apparently too large." As the census includes the product of every farm or garden over three acres, and of those less than three acres, where the product amounts to $500, this estimate certainly does seem above the mark — but let us include it and at the same time include a considerable number of workers who appear in the occupation tables as laborers (not specified). Of this class we find reported 1,913,373, with the footnote: "In agricultural districts 'agricultural laborers' are often reported simply as 'laborers.'"

Not all this class is engaged in agriculture. At the Ninth Census Superintendent Walker estimated that one-fourth of this class should be included in manufacturing estimates. If we assign one-fourth of this class to agriculture and one-fourth to manufactures, one-half remains as employed in personal service, trade or transportation. Including one-fourth of this class, and Mr. Harris' large estimate of products not included in the census, we have $279 as the average yearly earnings of over 40 per cent. of the workers of the United States. That this average, which includes not only wages of laborers proper but the earnings and profits of farm owners, is not below the mark is shown by the results of the investigations of the statistician of the Department of Agriculture, Mr. J. R. Dodge, who has made nine extended investigations of farm wages, and discovered the average wages in 1890 to have been, with board, $12.54; without board, $18.34 per month. This average is largely affected by the low wages of negro farm laborers

of the South. The average for the different sections is given as follows:

Southern states		Other states	
Without board	With board	Without board	With board
$14.77	$10.10	$23.01	$15.52

This, of course, is for men and pay while working, while the figures we have obtained are the yearly earnings of all classes, though less than 9 per cent. of the workers reported are females.

Let us next inquire as to profits of capital invested in manufacturing industry and the wages of operatives.

In the manufacturing statistics of the Eleventh Census we find the value of all products reported as:

		$9,372,437,283
Cost of material - - -	$5,162,044,076	
Amount paid as wages - -	2,283,216,529	
Miscellaneous expenses - -	631,225,035	
	$8,076,485,640	
This leaves as profit on investment -		$1,295,951,643

Miscellaneous expenses include rent paid for tenancy, taxes (including internal revenue), insurance, repairs (ordinary of buildings and machinery), interest paid on cash used in the business, and all sundries not elsewhere reported. Though the rent paid for hired property and interest paid on borrowed cash are included in the expenses, we find that the value of the hired property and the borrowed cash are included in the amount of capital reported. The value of the hired property is reported separately, but it is remarked: "Borrowed cash is included in the capital reported at the census of 1890, but it is impossible to state in which of the different items it is included, as the schedule of inquiry did not require such a statement. The amount can be estimated by computation based on the interest reported under miscellaneous expenses."

The amount of interest reported is $41,193,745. As the borrowed cash is included in the amount of capital reported, this amount paid as interest cannot be properly included in expenses, and we must therefore add it to the amount of profits which we have discovered, making

$1,337,144,888. Dividing this by the amount of capital reported, exclusive of hired property, the rent of which has been included in the expense account, and we have as the percentage of profit on capital invested in manufacturing and mechanical industry 22 per cent. Though the cost of repairs of machinery is included there should, it would seem, be an allowance of, say, 4 per cent. of the value of machinery for renewal, this would amount to $63,371,055 and reduce the percentage of profit to slightly less than 20 per cent. It must be understood that the salaries of officers of corporations, clerks, and the estimated value of the services of the employer are included in the wage account; so that this profit represents solely the return on the investment.

Let us next discover the average annual earnings of those engaged in this industry. The amount of wages reported is $2,283,216,529 and the average number of employees 4,712,612, including 461,009 officers, firm members, and clerks, whose salaries aggregate $391,988,208. The amount of wages, however, is the earnings of the whole number of employees, and the correct average annual earnings can only be discovered by dividing the total wages by the total number of employees. This number is not reported, but may be ascertained approximately from the tables of occupation as returned by the enumerators of population. In these tables we find the number reported as engaged in manufacturing and mechanical industry to be 5,091,293. This, however does not include the clerks, whose salaries are included in the wage account, and who, as we discover from a footnote and explanatory remarks, are enumerated as clerks and copyists, under the head of "Trade and Transportation." Of the 461,009 officers, firm members, and clerks (average) in the 355,416 establishments, we may fairly assume 90,000 to be clerks. There is, besides, as we have already discovered, a larger class who are not enumerated as engaged in manufacturing or mechanical industry, but whose labor contributes to such production, and whose wages are included in the total wages of that industry. Of this class, as we have already stated, General Walker estimated in 1870 that one-fourth should be included in the number of those engaged in this industry. Though this proportion seems below the mark, let us add one-fourth of this class (478,343), with the 90,000 clerks, to the number reported in the occupation tables as engaged in manufacturing and mechanical industry. This gives a total of 5,659,636. Dividing the total wages by this number, we have as the

average annual earnings per employee $403. It must be remembered that this includes the salaries of officers, firm members, and clerks, which average $850. Deducting the salaries of this highly-paid class from the wage account, and dividing the remainder by the number of operatives proper, we have as the average annual earnings of operatives $364, or $7.00 per week. There is undoubtedly some small production not included in the census, but this is probably offset by a like deficiency in the enumeration of operatives. Taking this class and the agricultural workers together, which constitute over 62 per cent. of the total workers, we find the average annual earnings to be slightly less than $6.00 per week and very much less than $10.80 per week, the amount estimated by Commissioner Harris as the quota of each worker, without any reduction for capital, for land, or for supervision.

The average for the agricultural class, as we have seen, includes supervision. The census presents no summary of wages in the various mineral industries, but in the volume devoted to these industries we find that in the three principal mining industries wages, including superintendence and office force, were as follows:

	Total average No. employees	Total wages
Coal,	299,552	$112,286,099
Iron ore,	38,227	14,409,151
Stone,	82,374	30,555,877
	420,153	157,251,127

Making the apparent average earnings, $374.27.

This average is evidently somewhat too large, since it is obtained by taking the average number of operatives, instead of the total number, as a divisor.

We have no sufficient data for earnings in trade and transportation and in domestic and personal service, but it is hardly conceivable that the average earnings of these classes exceed those of the more important classes already considered.

The earnings of those in professional service who constitute but 4.15 per cent. of the number of those having gainful pursuits could not so greatly effect the average, that taking Commissioner Harris' estimate of production there would not remain for the owners of capital and those who conduct the business a very considerable proportion of the product. As, however, the consumer does not purchase of the producer, but of the retailer, who in turn purchases of the jobber, there is

in the distribution of products, besides the cost of transportation, which Commissioner Harris has considered, a cost to the consumer and a profit to capital, which he has entirely overlooked. This charge upon the larger part of the product can be estimated at no less than 10 per cent. to the jobber and 25 per cent. to the retailer. Of this charge a large proportion goes to the owners of property in our business centers as rent, which is also an important element in the cost of production.

Commissioner Harris deplores the lack of data as to the value of "land," "pure and simple," and "improvements on land" and remarks that to "mention one of the questions that depend upon this datum, the single tax theory could be confirmed or refuted by showing the actual status and trend of the land factor in the production of wealth." Though we have no data of land separate from improvements, we have in the Eleventh with the Tenth Census for the first time what seem fairly comparable data of the value of land and improvements and the only kind of data that it is possible to obtain until at two censuses report is made as to the value of land "pure and simple."

According to the Eleventh Census the valuation of the property of the United States in 1890 was as follows:

Total,	$65,037,091,197
Real estate with improvements thereon,	39,544,544,333
Live stock on farms, farm implements, and machinery,	2,703,015,040
Mines and quarries, including product on hand,	1,291,291,579
Gold and silver coin and bullion,	1,158,774,948
Machinery of mills and product on hand, raw and manufactured,	3,058,593,441
Railroads and equipments, including $389,357,289 for street railroads,	8,685,407,323
Telegraphs, telephones, shipping, canals, and equipments,	701,755,712
Miscellaneous,	7,893,708,821

Thus nearly 50 billions of the 65 billions of property is represented by real property, including mines and other properties, the value of which is largely the franchise conferring the use of land.

Deducting the value of vacant lands and Indian reservations not included in the valuation of the Tenth Census, the value of real estate in 1880 and 1890 was as follows:

	1880	1890
Farms with improvements, -	$10,197,096,776	$13,279,252,649
Residence and business real estate,	11,881,000,000	25,324,260,306
	22,078,096,776	38,603,512,955

Thus, though there was an increase in total area of 16.25 per cent. and in area of improved farms of 25.58 per cent., the value of farms and improvements increased but 30 per cent., while the value of other real estate increased 113 per cent. The total value of the property of the United States in 1880 was placed at 43,642 million dollars, and in 1890, deducting vacant lands not included in the valuation of 1880, $64,096,059,819, making the increase $20,454,059,819.

Of this increase we find over 16½ billions to be of real property, not including mines, railroads, and similar monopolies. The value of mines (including petroleum wells and one-half annual product) was reported in 1880 as 781 million dollars, and in 1890, as shown in the preceding table, the value of mines (including product on hand) was reported as $1,291,291,579. The values of railroads, as reported at the two censuses, being made on different bases, are not comparable.

How much of this increase of real property representing the larger proportion of the increased valuation of the decade represents improvements and an increase in social wealth, and how much of it is simply an increase of monopoly values? Regarding this we have unfortunately but little available data. As it is evident that this increase in real values is confined almost entirely to our cities, the facts disclosed by a commission of real estate experts appointed by Mayor Swift throw some light upon the subject.

The land and improvements reported on is that part of the south division of Chicago north of Twelfth street, covering an area of 351.42 acres. This commission summarized their report as follows:

We find in our opinion:

The value of land to be, - - - - -	$337,342,880
The value of improvements to be, - - - -	101,104,300
Total value exclusive of property marked exempt from taxation, - - - - - - -	$438,447,180

The assessors' value of the same property, returned by the assessors for the year 1895, was as follows:

Land,	$24,726,880
Improvements,	15,941,840
	$40,668,720

We find also the value of land and improvements marked exempt on the assessors' books, not including the city hall block or real estate owned by the United States government, to be:

Land,	$20,404,050
Improvements,	1,832,200
	$22,236,250

Here we find that the land in the most closely built portion of the city, having the most expensive buildings, is valued at over a million dollars an acre and nearly 3½ times the improvements. That similar conditions exist in all centers of trade and manufacture is too well known to need demonstration.

These rapidly increasing values are but the measure of the tribute paid by industry to monopoly, and show how far we have departed from the competitive system of which Commissioner Harris claims to be the spokesman. His attempted demonstration that the wage-earner receives practically all that is produced seems no answer whatever either to the socialist or the single taxer, who each maintain that the adoption of the system which they advocate would result not only in a more equitable distribution but in a greatly increased production of wealth.

H. L. Bliss.

Chicago.

BOOK REVIEWS.

Social Rights and Duties. By LESLIE STEPHEN. London: Swan Sonnenschein & Co., 1896. 8vo. 2 vols., pp. 255 and 267.

THE open-mindedness and breadth of outlook of these reprinted addresses of Leslie Stephen are most admirable. Few writers exemplify so completely as the author the spirit of his own fine saying: "In the struggle to discover truth even our antagonists are necessarily our co-operators."[1] As the natural accompaniment of this intellectual temper, is a certain lack of definiteness in thought and in expression. The author is so conscientiously cautious that after the most careful balancing of opposing arguments he sometimes hesitates to report which carries the greater weight. The reader is, however, compensated for this defect, if such it be, by many passages brilliant and striking in form as they are admirable in substance. For example, the weak point of some popular economic fallacies is aptly brought out in the sentence: "While people are proposing to lengthen their blankets by cutting off one end to sew upon the other, one has to point out that the total length remains constant."[2] Again a common failing is cleverly and justly characterized by the designation of it as the "error of inventing some scheme which is in sociology what schemes for perpetual motion are in mechanics."[3]

To the economist, the essays of most immediate interest are those dealing with the relations of "Science and Politics" and with "the Sphere of Political Economy," with "Competition" and with "Luxury." The more general student of sociology will be interested in nearly all the essays, but especially in those entitled "Social Equality," "Ethics and the Struggle for Existence," and "Heredity."[4] I shall summarize, partly in the author's own phraseology, some of the discussions and results of the above chapters of the work.

The essay entitled "Science and Politics" is naturally of a general

[1] Vol. i. p. 161. [2] Vol. i. p. 123. [3] Vol. i. p. 131.

[4] The titles of the remaining essays are: The Aims of Ethical Societies, Punishment, the Duties of Authors, the Vanity of Philosophising, and Forgotten Benefactors.

and introductory character. It discusses the possibilities of achieving a real science of sociology. Attempts in this direction have been so far futile, they have resulted for the most part merely in "a heap of vague, empirical observations, too flimsy to be useful in strict logical inference." Indeed, so complicated and so vaguely understood is human character, that the social phenomena that depend upon it can never be made the subject of an exact and complete science of sociology. Still we must recognize that social development is subject to laws however complex they may be, and although we may not hope to understand it in its entirety, we should nevertheless seek to study in the scientific method such of the facts as we can grasp. Physiology, although a less exact science than physics, is not for that reason to be neglected; no more are sociological inquiries to be despised because they do not result in a complete body of exact laws. The study of social development in the scientific spirit "implies, in the first place, the abandonment of the weary system of hunting for fruitful truths in the region of chimeras, and trying to make empty logical concepts do the work of observation of facts. It involves, again, a clear perception of the kind of questions which can be profitably asked, and the limits within which an answer, not of the illusory kind, can really be expected. And then we may come to see that, without knowing it, we have really been trying a vast and continuous experiment, since the race first began to be human. We have, blindly and unconsciously, constructed a huge organism which does, somehow or other, provide a great many millions of people with a tolerable amount of food and comfort. We have accomplished this . . . . unconsciously; for each man limited to his own little sphere, and limited to his own interests, and guided by his own prejudices and passions, has been as ignorant of more general tendencies as the coral insect of the reef which it has helped to build. To become distinctly conscious of what it is that we have all been doing all this time, is one step in advance. We have obeyed in ignorance, and as obedience becomes conscious, we may hope within certain narrow limits, to command, or, at least, to direct. An enlarged perception of what have been the previous results may enable us to see what results are possible, and among them to select what may be worthy ends. It is not to be supposed that we shall ever get beyond the need of constant and careful experiment. But, in proportion as we can cultivate the right frame of mind, as each member of society acquires wider sympathies and a larger horizon, it

is permissible to hope that the experiments may become more intelligent; that we shall not, as has so often been done, increase poverty by the very remedies which are intended to remove it, or diverge from the path of steady progressive development, into the chase of some wild chimera, which requires for its achievement only the radical alteration of all experience."[1]

Political economy is sometimes assumed by its exponents and its critics to start with the primary assumption that "the economic man," or man viewed for the sake of simplicity as purely a business animal, is governed primarily by his desire for wealth. He may however desire this wealth for the sake of many interests other than "those which he buttons into his own waistcoat," for the benefit of his family or friends, or even for the promotion of knowledge or the establishment of useful institutions; and economic theory should not even seem to ignore these broader aspects of the desire for wealth. But beyond this minor criticism, the assumption of the economic man is an altogether insufficient basis for economic reasoning. "The very conception of economic science supposes all that is supposed in the growth of a settled order of society. . . . . The economist really assumes more—and rightfully assumes more—than he sometimes claims. He assumes what Adam Smith assumed at the opening of his great treatise: that is, the division of labor. But the division of labor implies the organization of society. It implies that one man . . . . is confident that he will be able to exchange the products of his own labor for the products of the other man's labor. This, of course, implies settled order, respect for contracts, the preservation of peace, and the abolition of force throughout the area occupied by the society. And this again is only possible in so far as certain political and ecclesiastical and military institutions have been definitely constructed."[2]

The object of political economy is to explain the workings of the industrial organization of society which through the division of labor and the coworking of the various kinds of labor adds so enormously to the efficiency of individual effort. The economist should seek to describe this industrial organization somewhat as a military writer might describe the organization of an army. He should explain the functions and interrelations of the various members and groups, viewing them as economic agents (just as the military writer would

[1] Vol. i. pp. 88–90. [2] Vol. i. p. 95.

view them as soldiers), recognizing indeed the psychological and political conditions implied but not pausing to analyze these further than his own purposes require. In order thus to explain the mutual relations of the members of the industrial organization the economist has to make certain other assumptions or generalizations from experience — which are ordinarily so obvious that they will hardly be disputed — such for example "that scarcity implies dearness and plenty cheapness; that commodities flow to the markets where they will fetch the highest prices; that there is a certain gravitation towards equalization of profits among capitalists and of wages among labourers," and so forth. In general "the question of the play of economic forces reduces itself to a problem which may be thus stated: What are the conditions of industrial equilibrium? How must prices, rates of wages, and profit be related in order that the various classes concerned may receive such proportions of produce as are compatible with the maintenance of the existing system of organization?"[1]

Our author next considers, only to reject, the conception of political economy as a mathematical science. It is said that political economy "deals throughout with quantities," but these quantities, in turn, depend upon the play of human desires and human characteristics too complex and variable to be reduced to mathematical formulas. "Differences of national temperament, of political and social constitution, of religious and ecclesiastical organization, will all have an effect; and, therefore, a formula true here and now must, in all probability, fail altogether elsewhere. The formula is, in the mathematical phrase, a function of so many variables that it must be complex beyond all conception if it takes them all into account, while it must yet be necessarily inaccurate if it does not take them into account. But, besides this, the conditions upon which the law obviously depends are not themselves capable of being accurately defined, and still less of being numerically stated. . . . . There is no arithmetical measure of the forces of love, or hunger, or avarice, by which (among others) the whole problem is worked out."[2]

The historical school, as well as the mathematical, however effective it may be in its criticism of the classical political economy, provides no adequate substitute therefor. The complexity of the facts is such that the method of direct observation and comparison, without the aid of deduction, fails to unravel their significance, and "a treatise on

[1] Vol. i. p. 100. [2] Vol. i. pp. 104, 105.

political economy becomes nothing but a miscellaneous collection of facts, with no definite clew or uniform method of reasoning."[1]

Our author is then more in sympathy with the methods (not necessarily with the conclusions) of the moderate members of the deductive school than with their critics, whether of the "mathematical" or the "historical" persuasion. The classic political economy is, in a word, useful so far as it goes; but it does not go so far as some of its devotees would have us suppose. It describes the body politic somewhat as mere mechanics would describe the physical body, accurately, but, of course, not completely. In each case "we have an instance of the way in which perfectly true propositions may, so to speak, be imbedded in a larger theory, and may be of the highest importance, though they are not by themselves sufficient to solve any concrete problem."[2] The laws which the economists have formulated "are not laws which, even if established, would enable us to predict the results of any given action; but they are laws which would have to be taken into account in attempting any such prediction."[3] The view of the author of the present position of economics may, perhaps, best be summarized in the following quotation: "I think myself that a study of the good old orthodox system of political economy is useful, ... even where it is wrong, because, at least, it does give a system, and therefore forces its opponents to present an alternative system, instead of simply cutting a hole in the shoe when it pinches, or striking out the driving wheel because it happens to creak unpleasantly. And I think so the more because I cannot but observe that whenever a real economic question presents itself, it has to be argued on pretty much the old principles, unless we take the heroic method of discarding argument altogether."[4] "What I should say (for the more positive services of political economists) is that they have explained, and, I suppose, with considerable accuracy, what is the actual nature of the industrial mechanism; that they have explained fairly its working where the economics are practically the sole or dominant motives; and that they have thus laid down certain truths which require attention even when we take into account the play of other more complex and, as we generally say, higher motives."[5]

The chapters on luxury, competition, and social equality are in each case given partly to a discussion of the significance of these much

[1] Vol. i. p. 127.
[2] Vol. i. p. 110.
[3] Vol. i. p. 128.
[4] Vol. i. pp. 131–132.
[5] Vol. i. p. 130.

misunderstood terms and partly to a consideration of the problems of ethics and politics that they suggest. The gist of the author's attitude may be surmised from the following excerpts: "Whatever employments of wealth contribute to make a man more efficient as an individual member of society, are not to be condemned as luxurious."[1] "The end of a fair competition is the discovery of the ablest men, with a view to placing them in a position where their talents may be turned to most account. . . . . But it must be added that fairness includes more than the simple equality of chances. It supposes also that there should be some proportion between the rewards and the merits."[2] "Equality in my sense implies that everyone should be allowed to compete for every place that he can fill."[3] "The only sufficient reason for classes is the efficient discharge of social functions."[4]

The essay on "Heredity" is in its most essential portions an argument that the development of civilization has come not from any improvement through a favorable working of natural selection in the breed, and so in the innate or inherited character of men, but through the accumulation and the handing down of knowledge, of capital and of the means for controlling to human ends the forces of nature. It is not that the average individual has become through selection intrinsically more capable than his ancestors, but that he has at his command the accumulated experience and wisdom of the race. In the same way, it is probable that human advance will mainly depend in the future, not on an improvement of the race by selection, but on an increase of knowledge, an improvement in institutions, and a better training and development of character, especially in the young. If in the words of the author, "the only possible remedy [for present evils] were by so modifying the struggle for existence that the inferior forms may be killed off and a better breed of humanity take the place of the present, we should certainly feel that we were confined within very narrow limits. I do not for a moment say, that such considerations may not point to important practical conclusions. I should be very glad to hear of any practical suggestions, for so applying these doctrines as to increase the probability that the next generation may be stronger, healthier, and more intelligent than the present. But I also assert that the most obvious facts also show that there are enor-

[1] Vol. ii. p. 135.
[2] Vol. i. pp. 160–164.
[3] Vol. i. p. 213.
[4] Vol. i. p. 204.

mous possibilities of progress without supposing any such organic transformation."[1]

The discussion of the relation between "Ethics and the Struggle for Existence" forms perhaps the most valuable and suggestive portion of the work. In form, it is mainly an argument against the position of Professor Huxley that the ethical progress of society demands the nullifying of the natural process of struggle for existence and the survival of the most fit. Leslie Stephen points out that even in the animal world the struggle for existence is not as harsh and revolting as it at first sight appears, and that for the rest it is so far a merely unmoral instead of immoral process. But the real force of his argument is in the firm grasping of the other horn of the dilemma—in the assertion that no sentiment or action which can be shown to tend to enervate the race is in any true sense moral. The excellence of his statement of some of the problems involved will excuse the length of following citation.

The apparent antagonism between the natural laws of race improvement through selection and the claims of morality "seems to be felt in regard to those purely altruistic impulses, which, at first glance at any rate, make it apparently our duty to preserve those who would otherwise be unfit to live. Virtue, says Professor Huxley, is directed 'not so much to the survival of the fittest' as to the 'fitting of as many as possible to survive.' . . . It is often complained that the tendency of modern civilization is to preserve the weakly, and therefore to lower the vitality of the race. This seems to involve inadmissible assumptions. In the first place, the process by which the weaker are preserved consists in suppressing various conditions unfavorable to human life in general." But "to preserve life is to increase the population, and therefore to increase the competition; or in other words to intensify the struggle for existence. The process is as broad as it it long. What we would have to show in order to justify the inference of a deterioration due to this process, would be, not that it simply increased the number of the candidates for a living, but that it gave to the feebler candidates a differential advantage; that they are now more fitted than they were before for ousting their superior neighbors from the chances of support. But I can see no reason for supposing such a consequence to be probable or even possible." "The struggle for existence . . . . rests upon the unalterable facts that the world is limited

[1] Vol. i. p. 50.

and population elastic; . . . . and under all circumstances those who are fitted by reason of intellectual or moral or physical qualities will have the best chance of occupying good places, and leaving descendants to supply the next generation. It is surely not less true that in the civilized as much as in the most barbarous races, the healthiest are the most likely to live, and the most likely to be ancestors. If so, the struggle will still be carried on upon the same principles, though certainly in a different shape."

"It is true that this suggests one of the most difficult questions of the time. It is suggested, for example, that in some respects the 'highest' specimens of the race are not the healthiest or the fittest. Genius according to some people, is a variety of disease, and intellectual power is won by a diminution of reproductive power. A lower race, again, if we measure 'high' and 'low' by intellectual capacity, may oust a higher race, because it can support itself more cheaply, or, in other words because it is more efficient for industrial purposes" . . . . "we are engaged in working out a gigantic problem: What is the best, in the sense of the most efficient type of human being? What is the best combination of brains and stomach? We turn out saints, who are 'too good to live,' and philosophers, who have run too rapidly to brains. They do not answer in practice, because they are instruments too delicate for the rough work of daily life. They may give us a foretaste of qualities which will be some day possible for the average man; of intellectual and moral qualities, which, though now exceptional, may become commonplace. But the best stock for the race are those in whom we have been lucky enough to strike out the happy combination, in which greater intellectual power is produced without loss of physical vigor. Such men, it is probable, will not deviate so widely from the average type. The reconciliation of the two conditions can only be effected by a very gradual process of slowly edging onwards in the right direction. Meanwhile the theory of a struggle for existence justifies us, instead of condemning us, for preserving the delicate child, who may turn out to be a Newton or a Keats, because he will leave to us the advantage of his discoveries or his poems, while his physical feebleness assures us that he will not propagate his race."[1]

CARLOS C. CLOSSON.

[1] Vol. i. pp. 243–250.

Qu'est ce que le progrès? Examen des idées de M. Herbert Spencer. Par N. MIKHAILOWSKY. Traduction du Russe, Revue par PAUL LOUIS. Paris: Felix Alcan, 1897. 12mo, pp. 200.

THIS book appeared in its original form in 1869 and is, therefore, an examination of the ideas of Mr. Spencer only as they had been published up to that time. The brunt of the author's criticism falls upon the essay, Progress: Its Law and Cause. The laws of the instability of the homogeneous, and the multiplicity of effects laid down in that essay, require certain modifications before they can be accepted. The homogeneous is indeed unstable, but why? It is because, says our author, the homogeneity is submitted to the action of different forces, it is due to the heterogeneity of the environment. A homogeneous universe then would not be unstable. There would be nothing to disturb its equilibrium. It is only heterogeneity that can produce the transformation of the homogeneous to the heterogeneous, that is, evolution.

This seems plausible enough, but the author seems to forget that Spencer attributes to matter the endowment of indestructible motions, and that motion *produces* the phenomenon of aggregation. All that is necessary, therefore, to change a perfectly homogeneous mass of matter to a heterogeneous one is the preponderance of one class of motions over another. It may be said, too, that the resort of the critic to a purely imaginary state to find an exception to the law is practically an admission that it holds good in the universe as we know it, and that is all that Spencer would claim. The author concludes this part of his criticism with the statement that the formula of progres might be more clearly expressed in the form, the passage of the less heterogeneous to the more heterogeneous, but for brevity, and with the necessary mental reservations he adopts the Spencerian formula.

This, one is inclined to say, is rather barren criticism. But the book contains much that is better. The weak point in Spencer's system, that is the omission of the anthropo-teleological factor in social progress, or perhaps we should say his omission of considerations of human happiness from his definition of progress is hit upon by this comparatively early writer and exposed with great clearness. One finds some sharp criticism, too, of the organic conception of society. The fundamental difference between society and an organism, says the writer, is that in an organism it is the whole which suffers and enjoys, while in

society it is the parts (p. 76). To identify society and an organism is to neglect both the suffering and the enjoyment of man.

As to the question, What is Progress? the author answers it in the following way: Progress consists in the gradual approximation of the integrality of individuals, of the most complete and varied division of labor between the organs, and in fact in the gradual approximation of the smallest division of labor amongst men. Everything that is contrary to this development, he declares, is immoral, unjust, unreasonable, and harmful; while everything that diminishes the heterogeneity of society, and thereby increases the heterogeneity of its members is moral, just, reasonable, and useful (p. 200).

One would think that a book worth writing and translating would be provided with an index, or at least a table of contents. But both these conveniences are wanting. Not even headings to the various chapters are supplied. The book is, therefore, uninviting to the reader and as useless to the average student as it well could be. One might think that it was published with the idea that nobody would ever read it.

I. W. HOWERTH.

Outlines of Elementary Economics. By HERBERT J. DAVENPORT. New York: The Macmillan Company, 1897. 12mo. xiv + 280.

AS AN economist Mr. Davenport is best judged by his "Outlines of Economic Theory," which was published in 1896 and was reviewed in this JOURNAL, for September 1897. His smaller work just issued will therefore be considered here only on its pedagogical side.

The first noticeable feature of the book is its small size—about one-half that of most other text-books in political economy. This, with the substantial binding, is no small advantage in a book for school use.

The feature next noticed is the liberal supply of pedagogical questions. Each subject is introduced in a series of questions placed at the head of the chapter or portion of a chapter. In the preface the author advises that these "questions be attempted, or a discussion of them had in the class room, before the text is read by the student or appointed for him to study." This is admirable. A brief preliminary quiz which will bring out the vital problem in the advance lesson is frequently employed by teachers; when the students are immature, a

start like this is often necessary to enable them to study the lesson understandingly. Then at the close of each portion of the text there is another series of "suggestive questions" which apply the principles in many forms. The questions are all well selected; a free use of them would effectively cure that worst of all methods of study which is nowhere worse or more common than in political economy — mere memorizing of the text.

The method of treatment is thus described in the prefatory note: "Outside of the work which the questions require of the students, the treatment is studiously theoretical rather than descriptive." The exception here made is hardly correct: even the questions are essentially theoretical. They are descriptive only in that they "summon to the aid of the student his fund of observation, experience and crude generalization." Scarcely a question in the entire book calls for research or accurate knowledge of facts. There is a footnote in fine print giving the history and present status of the silver question, and another giving some figures from the census to show the small importance of the tariff question. The chapter on currency contains a sample bank statement. The rest of the book may be set down as pure theory.

Is this the way to teach elementary economics? The author justifies his course in these words: "In neither of these aspects (culture and practical), can any training be adequate, or the results of it steadfast in the mental equipment, if the treatment is merely descriptive and discursive, instead of offering a close-knit and coherent body of elementary theory." No good teacher will dispute this. But when Mr. Davenport wishes to make political economy as theoretical as mathematics, few will agree with him. In the first place, for better or for worse, the trend of educational thought is now in the opposite direction — to put more illustrative matter from real life into school work; and I mean by real life not the vague or hypothetical, but that which actually takes material form in a certain time and place. Many of the principles of physics could be developed from hypothetical illustrations, and formerly were taught in that way; but now every good school requires the student to verify the principles in the laboratory.

But I am firmly of the opinion that the trend of education is right and that Mr. Davenport is wrong. Not that any loose threads should be allowed in the "close-knit and coherent body of elementary theory," but that some descriptive matter should be knit in with it. Let there be less discussion of supposed illustrations and some inter-

pretation of economic history ; if necessary, let the body of theory be less elaborate, provided that as far as it goes, the student has some basis of fact to verify it. A few students, those of a speculative mind, relish the pure theory ; but a large majority take greater interest in the descriptive study. Furthermore, it is desirable that the study of economics in school should give the student some acquaintance with the literature of the subject, including sources, and some training in research. It seems to me there is much positive harm in turning out students whose study of economics has been confined to theory. The perfection of the theory gives them a mistaken idea of the value of their knowledge. They do not know that the difficult thing is to study the facts and establish premises from which to reason. Hence an attempt to deal with a practical problem exposes them and their study to contempt.

It is true Mr. Davenport's book might be supplemented by other books or documents that would present the descriptive side. Yet it nowhere refers to such supplementary material or in any way aids the teacher in finding it or using it. The teachers of economics who are not specialists, and they are the great majority, will find that this text-book has left to them a task which is beyond their powers. Specialists would probably find it easier to invent hypothetical problems, as Mr. Davenport has done for them, than to do the hack-work which he has left undone, namely to select topics for supplementary study and hunt up references for them.

FREDERICK R. CLOW.

Esquisses de litterature politico-économique. Par N. CH. BUNGE, Ancien professeur à l'université de Kiew. Traduit du russe. Geneva: Georg & Co., 1898. 8vo. pp. xliii.+455.

THIS contribution to the history of economic doctrines is a collection of monographs of various dates (1860, 1868, 1894), revised and brought down to the date of publication of the Russian edition (St. Petersburg, 1895). It comprises four essays: Outlines of the History of Economic Doctrines; The Theory of the Harmony of Private Interests; John Stuart Mill as Economist; Schmoller's Verdict on Menger.

Part I (pp. 1–192) on the History of Doctrines, is a rapid sketch of the development, or rather of the sequence, of economic theories

from classical antiquity (Plato, Aristotle) to the later developments of the Historical School, closing with Schmoller as the great and definitive exponent of modern economic doctrine and method. It considers the Physiocrats, the classical writers, the Utopian socialists, the philosophical and critical socialist writers (Rodbertus, Proudhon, Marx), the school of Harmony of Interests (Carey, Bastiat), and the group of German writers identified with the historical method in economics. It is for the most part a colorless presentation of doctrines, and does not appreciably depart from the beaten paths, except in the large space allowed the socialists and the exponents of the harmony of interests.

Professor Bunge has little to say for the economists of the English line from Adam Smith down, and little to say in criticism of them that is not already commonplace. The same remark applies to his characterizations of Menger and his followers, who are classed with the English as "deductive." The hope for the future lies with the historical school, or more precisely with the "progressive historico-statistical school," of which Schmoller is the founder.

> The historico-statistical study of economic phenomena alone will avail for the advancement of political economy; but it is to be recognized that history and statistics have hitherto not given us available materials. This is due in part to the fact that economists have not recognized the importance of historical and statistical research, and in part to the limited range of facts covered by the field of history and statistics (p. 182). At the head of the contemporary (1868) historico-statistical school stands Tooke, the author of the *History of Prices* (p. 186). [But] it is Schmoller who has come in as the real founder of the new historico-statistical school (p. 187).
>
> The reason why contemporary political economy in our time presents, at the first glance, such a physiognomy of distraction is that the time for new generalizations has not yet arrived; and consequently this lack of congruity is rather a merit than a defect (p. 190).

Part II (pp. 193–301) presents an unusually painstaking exposition of Carey's doctrines on Value, Rent, the Effect of an Extension of Cultivation, and the Harmony of Private Interests, together with a criticism in detail. There is generous appreciation of Carey's deserts, of his kindly motives and his abounding faith in the substantial goodness and perfectibility of man.

> All that Carey says is true at bottom, but it holds only in certain exceptional cases — only so far as no one seizes what belongs to another although he has the power to do it (p. 301).

The discussion of John Stuart Mill (Part III, pp. 303–433) is more appreciative than much of what representatives of the historical school have said on the subject, but offense is repeatedly taken at Mill's *a priori* method and his independence of facts, *e. g.*, in his theory of production. The merit of this part of the book, as of the preceding parts, lies in a detailed exposition, in which, by the way, there is manifested no unusual sense of perspective or proportion. The author has derived some edification but very little profit from his study of Mill. What he has learned is what he knew already — that salvation for economic science is to be found in the historico-statistical method alone, and that this method could not be effectively applied until Schmoller had found it and set it in order.

Part IV (pp. 435–451) is substantially a restatement, with some slight abridgement, of Schmoller's strictures on Menger. What Professor Bunge adds to Schmoller's mordant dispraise may be given in his own words.

> Il faut ajouter à ces paroles de Schmoller, que ni Menger, ni ses disciples n'out, semble-t-il, rien produit jusqu'ici de transcendant.

T. B. V.

Die Unternehmerverbände (Konventionen, Kartelle), ihre Wesen und ihre Bedeutung. By ROBERT LIEFMANN. Freiburg, i. B.: J. C. B. Mohr, 1897. 8vo, pp. xii + 199.

SINCE 1870 the industrial world has seen a steady increase in the number of combinations and trusts. Up to 1883 little had been written about them. In this year Kleinwachter's *Die Kartelle* appeared, and the book has been followed by a rapidly growing literature on industrial combination. The present book is the latest addition to the number.

The purpose of the author is to establish some principles and clear cut distinctions for the analysis of the various forms of combination. Beginning with the mere union for purposes of agitation, like an eight-hour league, the author finishes his task with a discussion of Rings and Corners. The book is divided into three parts. Part I is devoted to an examination of the elements of a trust, or a higher order of combination. These elements, according to the author, are the *Verein*, the *Verband*, and the *Gesellschaft*. The first form is a very simple combination of individuals which in no way hinders their trade freedom or

economic activity. The object of a union of this kind is to secure legislation leading up to a Sunday closing law or eight-hour day. The *Verband* is a closer organization, really an association, which regulates the activity of its members for the general interest. The *Gesellschaft* is a still closer form of organization which has some one direct purpose to which the entire economic activity of its members must be subordinated. These forms may be so combined with one another as to explain pools, trusts, fusions and combinations. A historical study of the growth of these elements closes the part. Part II, the larger portion of the treatise, is given to an analysis of the character and workings of combinations; while Part III is devoted to some remarks on the importance and possible future of these organizations.

The author very candidly admits that it is difficult to distinguish existing combinations as belonging to any particular class arbitrarily made. Which goes to show that the effort to classify industrial movements is attended with great diffculty and small results.

The concluding remarks are conservative, almost negatively so. They do indicate, in a general way, the tendency of industrial combinations to develop into other forms and to widen their field. Some specific European examples are given showing this tendency. The book undoubtedly will serve a useful purpose in the general classification and study of industrial forms. But it will not be particularly valuable to Americans, for the reason that many of the distinctions made in the book have already been pointed out by such writers as Hadley, Clark, Gunton, Ely, Jenks, and von Halle. The last two writers of this group are the only ones who seem to be known to the author. Even the careful insistence that the undertaker must be studied as a risk-taker, and not as a profit-winner, is very familiar ground to American students and hardly needs the mention it is given.

On the whole, it may be said that the book shows careful study and thought and is clear and forcible, but has been anticipated by the writings of the economists mentioned above.

FRANK L. MCVEY.

State Control of Trade and Commerce, by National and State Authority. By ALBERT STICKNEY. New York: Baker, Voorhis & Co., 1897. 8vo. pp. xiv + 202.

IN this book the author has undertaken to indicate the tendencies and growth of English and American law in relation to trade and

commerce. His method is inductive. As a means of interpretation he uses classification based on the nature of industrial employment, a distinction being made between laws regulating private, and laws regulating public employments. Considering both English and American law from these two standpoints he concludes that the tendency in both countries has been to abandon all attempts by statute, or by the action of the government in any form, to interfere with the freedom of contract in private employments, while as to public employments, *i. e.*, those of a public or quasi public nature, like innkeepers, common carriers, etc., the tendency has been in the opposite direction,—to increase the degree of control by national and state authority. Having concluded that the tendency of the age is adverse to state control in private employment the author then proceeds to condemn recent legislation and adjudication in the United States, directed against "trusts" and monopolistic combinations, as opposed to the spirit of our institutions and adverse to industrial progress.

Before accepting these conclusions it may be well to notice some of the methods employed in reaching them. It goes without saying that a conclusion, arrived at through the process of induction, to be of any value, must be such as to account for all the facts and phenomena coming within the purview of the subject. It would be a very faulty method that would allow a conclusion to be drawn from a range of facts much more narrow than the field of inquiry,—general conclusion from special data,—and yet this seems to be the method employed in chapter I which treats of "The Course of the English Law as to State Control of Private Enterprise." The only data that the author purports to have examined are the laws concerning the price and quality of labor and certain classes of merchandise. Yet he concludes that the tendency in that country has been toward freedom from state control in private employments.

"It will appear," says the author further, after devoting about twenty-five pages to statutes *intended to fix, directly, the prices and quality of labor and merchandise*, "that the latest attempts in this country to control the so-called 'trusts' and 'monopolies' today are on the same line as these statutes have set forth." This conclusion certainly requires further explanation when we consider that the "statute of laborers," in fact all of the statutes cited, were passed in order to support one of the most iniquitous monopolies that the world has ever known,—that social and political monopoly which made the laborer a

serf and a slave to the property holding and governing classes. These laws, if we may accept the opinions of Thorold Rogers, and others, were passed in order to maintain monopoly and suppress efforts on the part of the people to obtain the right of free and open competition. Some have interpreted the abolition of these measures as evidence of a movement in the direction opposite to that indicated in this volume.

The same criticism may be offered to chapter III, devoted to "The Course of the American Law as to Private Employments until the Recent Decisions."

After considering the common law relative to conspiracy, the acts of the Continental Congress and of the various colonies in revolution, passed to support a depreciated currency, and a few decisions relative to labor combinations, the author concludes, that, until the New York decision of 1893, "it may be stated with accuracy, that any mere contract, which looked only to the raising or maintaining of the prices of the property of the contracting parties, or which looked to the regulation, only, of the actions of the contracting parties, or to the prevention of competition between the contracting parties and went no further, was neither criminal nor unlawful."

Are these data broad enough to give us any comprehensive knowledge of the subject in hand, viz., the course of the American law as to private employments? Is the conclusion, if true, of any special value? No mention is made of statutes attempting to control, the time of employment, those protecting labor from unfavorable competition; laws pertaining to contract and convict labor, the employment of women and children, regulating the "sweating system," requiring day labor on public works; laws controlling the security and payment of wages, such as lien laws; requiring payments at stated periods, requiring payment in money instead of "truck," preferring labor claims, to say nothing of those other forms of control which have to do with the health, safety, and education of employees. These certainly have to do with "private employments" and come properly within the main subject of "control." So, also, have the laws affecting contracts in private employments, other than those pertaining to labor, been ignored. Yet, presumably, from the data set forth, the author makes the statement, that, "therefore" (after the year 1777) "there was in this country virtually an entire abandonment of all attempts by statute, or by the action of government in any form, to interfere with the freedom of contract in private employments."

Assuming however that the author has been unfortunate in the title given to his work and the subject matter of his various chapters: assuming that the main thesis is that of a defense of "trusts" and "monopolies," he has failed to set forth any justification of them whatever, either in showing the tendency of law or by setting forth their economic significance. Admitting as true "that any mere contract which looked only to the raising or maintaining of the prices of the property of the contracting parties, etc., etc., was neither criminal nor unlawful" prior to 1893, does this stand as proof of the tendency of the age? Has the author shown that the forces, which brought about the legislation of which he complains, were not the same forces that caused the repeal of the statute of laborers and the passage of the act of 1870? Has the author shown any principle whereby the "trust" or "monopoly" is entitled to recognition as an instrument of economic progress? General statements have been made such as, "the experience of both the English and American peoples. . . . shows that such combinations work no substantial damage to any but the parties combining:" that, "no such combination has ever had any substantial result, other than to make a slight rise in prices, in some local market, for a very short time, etc.," that, "as a matter of historical fact, even in early times, . . . no substantial practical evil ever resulted from any attempt to merely raise prices of labor or merchandise on the part of either individuals or combinations of individuals. . . . But today with our vast modern development of the science and machinery of transportation, when the markets of the world have largely become one, when a rise in the price of any kind of merchandise immediately causes an increase in supply, . . . there is no longer any danger, from any attempt to enhance the price of merchandise.

If we admitted such statements as true, the conclusions, by *a priori* reasoning, might be granted. But are they true? Has it been the experience of both nations that "no such combinations have ever had any substantial result other than to make a slight rise in some local market for a very short time?" How does the author account for the fact that copper and many of the other products of this country controlled by monopolies have been held at prices far above the English market during a long period of years, while wheat and other agricultural products, the output of which could not be controlled by them, have uniformly sold for higher prices abroad? In both cases we were the export producers; in both we had a tariff on imports. How does he

account for the price of steel rails and other products of monopolies at home and abroad? How does the history of the Sugar Trust accord with this statement?

Again, have we in America that free and world-wide competition that would protect us "from any attempt to enhance the price of merchandise?" How does this statement accord with the fact that we have around us a "Chinese wall" within which all kinds of "trusts and monopolies" are fostered by the kindly *protection* of a tariff that precludes this free and world-wide competition; that this tariff is laid on the very products that are most completely within the control of these combinations? Having precluded competition from without, these trusts seek to preclude it from within.

It has been held by some writers that the purpose of recent legislation, having as its end "control of trade and commerce" in private employment as well as public, has been the conservation of the general welfare, and that in so far as contracts are opposed to the well being of the public it is the duty of the state to step in and impose regulations designed to make the order of business equitable and just to all concerned; not only equitable and just, but such as to give to the nation greatest strength in her people. It is on such grounds that the various laws have been upheld which regulate hours of employment and labor contracts, provide security for wages and time and manner of payment, protect employees, laws to prohibit mortgages on homesteads, exempt property from execution, etc. The opinion prevails that the recent legislation and adjudications of which the author complains is directed to the same end. At the least, therefore, it is incumbent on him to show that such is not the case, before statements of such purport might be expected to stand.

The volume may be said to have value in that it presents excerpts of laws and opinions that will be of use in any inquiry into the subject of which it treats. FREDERICK A. CLEVELAND.

Die Finanzverhältnisse der Einzelstaaten der nordamerikanischen Union. Von DR. ERNEST LUDLOW BOGART. Jena: Gustav Fischer, 1897. 8vo, pp. 157.

THIS monograph, the doctoral dissertation of an American student at the University of Halle, is a descriptive and statistical account of American state finance and taxation. It deals only incidentally with

national and local finance. Its object is a systematic presentation of the facts and features of our commonwealth finance.

The first fact that strikes the attention of the student of American commonwealth finance is the decay of the financial importance of the separate states. Out of an aggregate expenditure of 916 million dollars by national, state, and local government in the year 1890, but 77 millions were made by the states. The main cause of this decay Dr. Bogart finds in the severe restrictions that have been imposed by our state constitutions, in the last three decades, on the borrowing and taxing powers of the legislatures, because of the abuses made of these powers in the period 1820–1850. At the same time he does not fail to notice that these restrictions have, after all, only served to confirm the natural tendencies of American social and economic development to assign the more important spheres of public activity to national and local government.

In the second chapter of the monograph, the financial procedure of the states in the appropriation of money and the voting of taxes is carefully and interestingly described. The third chapter is mainly a survey of the various kinds of taxation employed. The concluding chapter deals with state debts. Dr. Bogart has presented his material in an orderly and convenient form, with only such comment and discussion as were necessary to elucidate his subject. The work is well done and merits an English dress. A. C. M.

The Encyclopedia of Social Reform. Edited by WILLIAM D. P. BLISS, with the co-operation of many specialists. New York: Funk & Wagnalls Co., 1897. 8vo. pp. vii + 1439.

To general workers and students of social reform who are not specialists this book will be a boon. It brings within small compass a great mass of reliable information on the various social questions of the day. It is improbable *a priori* that any encyclopedia should be uniformly good. This is specially true of one that is devoted to such questions as that under consideration. The points of view from which the problems of social reform may be regarded are many and various. Each problem could be treated in as many different ways as there are points of view. It follows that the criticism bestowed upon any individual article in the book may vary according to the critic. Some subjects

have been omitted and others given greater or less prominence than those working in special fields will consider justifiable. On this point the editor states in his preface that his object has been to secure the greatest serviceability to the greatest number. The short bibliographies appended to the various articles furnish material for those who wish to pursue further a given subject. In addition to these the bibliography of bibliographies given in the appendix will be of service to the student.

Mr. Bliss has secured the best special talent in the country either to write or revise the articles on subjects in their several fields. Thus, Dr. Franklin H. Giddings, of Columbia, has revised the article on Sociology. Dr. Faulkner, of the University of Pennsylvania, has contributed that on Statistics, and Lucy M. Salmon, of Vassar, that on Domestic Service; Bimetallism has been revised by Dr. Andrews, of Brown, etc.

Unsigned articles are based on standard authorities and seem to be up to date. On controverted questions there is certainly an attempt to present both sides fairly. On the various subjects treated of, for example, in political economy, the views not only of the orthodox school, but also of the modern schools are given.

The living questions of the day are treated of in many instances by those who are in the thick of the fight. Rachel Foster Avery tells about certain phases of Woman Suffrage, and Frederick de L. Booth-Tucker of the work of the Salvation Army. Mr. Reynolds and Robert Woods, among others, give accounts of the Social-Settlement movement; Social Purity, Workmen's Organizations, Charity Organizations Societies; Temperance and Divorce reform are each treated of by those prepared to speak through years of active work. These are only a few of the many articles written by well-known specialists.

An interesting feature is the brief biographies of living individuals engaged in the work of reform. Generally speaking, only those are mentioned who have at least a national reputation. It would be possible to disagree with Mr. Bliss in his choice of those to be honored by personal mention, and a wider knowledge of the workers in the various fields represented would have added to his list names quite as worthy of recognition as those included, but on the whole he seems to have made his selections with discretion.

Mr. William Bliss, the editor of this encyclopedia, is well known through his lectures on Christian Socialism and his numerous tracts on the same subject. He is also the editor of the *American Fabian*, the

(American) *Social Science Library*, and author of *A Handbook on Socialism*.

The extremely small type used in parts of the volume make reading unpleasant, and would be a fair subject of criticism were it not that a larger type used throughout would make the book unwieldy. There are some typographical errors.

K. B. DAVIS.

Die Marxistische Socialdemokratie. Von MAX LORENZ. Leipzig: George H. Wigand, 1896. 12mo. pp. xii+229.

THERE are two features of the Marxian teaching that seem to me to be of definitive significance for today and for the future: the stress laid on the concept of society, with no complacent parade of philanthropy expressing itself in soup-kitchens and alms, but asserting itself as a dominant principle which in strain and struggle resistlessly pervades the entire cultural development,—this is the first; the second is Marx's insistence on the connection between the so-called material or economic movement and the so-called spiritual movement in the evolution of society. . . . . It is true, Marx has exaggerated the bearing and importance of both these points, because his work, like that of any other man, was conditioned by the circumstances of his time. But on both heads Marx has also shed such light as no one before him, nor in his time, nor—at least until the present—since his time; and that comes of the pre-eminent greatness of the man (pp. viii–ix.).

There is yet a further remark to be made: It is frequently assumed that the substantial core of the Marxian doctrine is the theory of labor-value and surplus-value, and that Marx arrives at his communistic demands directly from his surplus-value theory, on the basis of some assumed principle of justice or morality which requires communism as its fulfillment. . . . . But Engels disclaims, for Marx and for himself, any such "application of Morals to Economics." . . . . What comes about comes, according to Marx, not for equity's or morality's sake, but it comes as a causally, historically necessary phase of social evolution. The question is then as to the character of this causal, historical necessity in Marx's apprehension. Hence, our first effort must be directed to a presentation of the so-called "Materialistic Conception of History" (pp. xi–xii).

With a reverent hand, the author then enters on a discussion of this materialistic conception, which occupies the first of the four chapters (73 pages) of the volume. He insists on the antithesis between this and the individualistic conception—the conception which has dominated all the writings of the professed historians. After

some exposition, and some criticism of its philosophical short-comings, he reaches (p. 50) the consideration of a serious if not irremediable defect in the Marxian theory. While the materialistic interpretation of history points out how social development goes on — by a class struggle that proceeds from maladjustment between economic structure and economic function — it is nowhere pointed out what is the operative force at work in the process. It denies that human discretion and effort seeking a better adjustment can furnish such a force, since it makes man the creature of circumstances. This defect reduces itself under the author's hand to a misconception of human nature and of man's place in the social development. The materialistic theory conceives of man as exclusively a social being, who counts in the process solely as a medium for the transmission and expression of social laws and changes; whereas he is, in fact, also an individual, acting out his own life as such. Hereby is indicated not only the weakness of the materialistic theory, but also the means of remedying the defect pointed out. With the amendment so indicated, it becomes not only a theory of the method of social and economic change, but a theory of social process considered as a substantial unfolding of life as well.

It is as an expression of this materialistic theory of Marx and Engels that the Marxian Socialism is taken up in chapter II and examined point by point. The third chapter is a criticism of the aims and views of socialists as regards the outcome of the development. The author finds the extreme conclusions reached by the socialists — the dissolution of the state and the family, the disappearance of religion, etc. — are reached by a one-sided and arbitrarily limited application of their own principles. The author takes up the materialistic argument and carries it out to its logical consequences, with the result of reducing the socialistic millennium to absurdity, at least to his own satisfaction. In the hands of the social democracy, the teachings of Marx have hardened into a system and a creed, incapable of growth and incapable of meeting the practical exigencies of an unfolding political and social life. While the work of Marx was great and fruitful, "Marxism is but an episode."

T. B. V.

APPENDIX.

TABLE RELATING TO THE PRODUCTION OF GOLD SINCE 1850.

Year	Sauerbeck's index numbers for commodities in terms of gold		Index numbers for gold in terms of commodities reciprocal of index numbers	Production of gold in kilograms	100=average 1850
	100=average 1867-1877	100=average 1850			
1850	77	100	100	75.231	100
1851	75	97.4	102.6	107.153	142.4
1852	78	101.2	98.8	198.315	263.6
1853	95	123.3	81.1	233.975	311.3
1854	102	132.4	75.5	191.845	255.1
1855	101	131.1	76.2	203.280	270.3
1856	101	131.1	76.2	222.013	294.9
1857	105	136.3	73.3	200.572	266.6
1858	91	118.1	84.6	187.632	249.4
1859	94	122	81.9	187.933	249.8
1860	99	128.5	77.8	164.460	218.6
1861	98	127.2	77.6	171.215	227.6
1862	191	131.1	76.2	162.228	215.6
1863	103	133.7	74	160.999	213.9
1864	105	136.3	73.5	170.027	226
1865	101	131.1	76.2	180.860	240.4
1866	102	132.4	75.5	182.215	242.2
1867	100	129.8	77	156.485	207.9
1868	99	128.5	77.8	165.062	219.5
1869	98	127.2	78.6	159.795	212.3
1870	96	124.6	80.2	160.848	213.8
1871	100	129.8	77	160.999	214
1872	109	141.5	70.8	149.849	199.2
1873	111	144.1	69.4	144.487	192
1874	102	132.4	75.5	136.090	180.8
1875	96	124.6	80.2	146.704	195
1876	95	123.3	81.1	156.034	207.4
1877	94	122	81.9	171.532	228
1878	81	103.8	96.3	179.055	238
1879	83	107.7	92.8	164.008	218
1880	88	114.2	87.5	160.397	213.1
1881	85	110.3	90.6	154.980	205.9
1882	84	109	91.7	153.626	204.2
1883	82	106.4	93.9	143.575	190.8
1884	76	98.7	101.3	153.039	203.4
1885	72	93.5	106.9	163.105	216.8
1886	64	83.1	120.3	159.509	212.1
1887	68	88.3	113.1	159.156	211.5
1888	70	90.9	110.0	165.659	220.3
1889	72	93.5	106.9	185.809	247.2
1890	72	93.5	106.9	178 825	237.7
1891	72	93.5	106.9	196.586	261.3
1892	68	88.3	116.1	220.133	292.6
1893	68	88.3	116.1	256.236	340.6
1894	63	81.8	122.2	274.708	365.2
1895	62	80.5	124.2	306.133	407
1896	61	79.2	126.2	316.254	420.4

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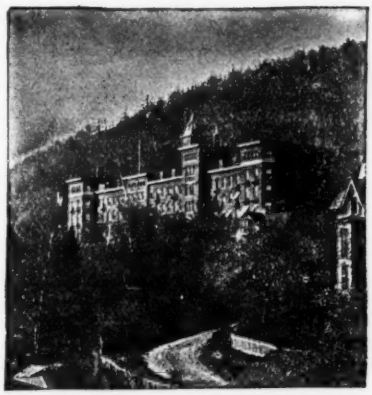

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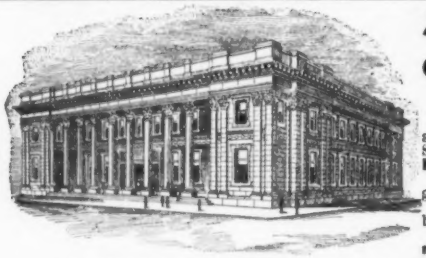

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